



United States
Department of
Agriculture

Forest
Service

Mt. Hood National Forest

Barlow Ranger District



Dog River Pipeline Replacement

Preliminary Assessment

USDA Forest Service
Barlow Ranger District
Mt. Hood National Forest
Hood River County, Oregon
T.1S., R.10E., S.34
T.2S., R.10E., S2,3,4,9,10,11; Willamette Meridian



**Vic Anderson and Paul Weigelt
at Dog River Pipeline Head Gate (8/19/1923)**



for the greatest good

United States
Department of
Agriculture

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November
2018

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Preliminary Assessment

Barlow Ranger District Mt. Hood National Forest

Hood River County, Oregon
Legal Description: T.1S., R.10E., S.34
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Table of Contents

Summary.....	7
Chapter 1 – Introduction.....	9
1.1 Document Structure	9
1.2 Background.....	9
1.3 Purpose and Need for Action.....	10
1.4 Proposed Action	15
1.6 Public Involvement	16
Chapter 2 – Alternatives	17
2.1 No Action Alternative	17
2.2 Proposed Action Alternative.....	18
2.3 Project Design Criteria/Mitigation Measures	19
Chapter 3 – Environmental Consequences	30
3.1 Vegetation Resources	31
3.2 Soil Productivity	34
3.3 Hydrology.....	36
3.4 Fisheries and Aquatic Fauna	57
3.5 Aquatic Conservation Strategy.....	93
3.6 Wildlife.....	95
3.7 Botany	116
3.8 Invasive Plant Species	117
3.9 Recreation.....	119
3.10 Visual Qualities.....	124
3.11 Cultural Resources.....	130
3.12 Congressionally Designated Areas	138
3.13 Climate Change	139
3.14 Environmental Justice and Civil Rights.....	140
3.15 Other Required Disclosures	141

List of Figures

Figure 1. Vicinity Map of Dog River Pipeline Replacement Planning Area	8
Figure 2. Forest Plan Land Use Allocations within Dog River Pipeline Replacement Planning Area.....	12
Figure 3. Northwest Forest Plan Land Use Allocations within the Dog River Pipeline Replacement Area	14
Figure 4. Crow Creek Dam Release and Spillway Flows	42
Figure 5. Seven-day-minimum and maximum temperatures in South Fork Mill Creek.....	43
Figure 6. Summer average daily temperature for South Fork Mill Creek (MHNF 2017b).	44

List of Tables

Table 1. Projects that the IDT considered in their analysis.....	30
Table 2. Existing Acres by Plant Association within Proposed Project Area	31
Table 3. Monthly Average Flow for Dog River and the Dog River Pipeline	40
Table 4. Estimated Mean Monthly Percent of Dog River Flow Diverted into the Dog River Pipeline under the No Action and Proposed Action Alternatives	45
Table 5. A summary of cumulative effects on water quantity and quality.	53
Table 6. Summary of environmental baseline conditions in the Dog River Pipeline Replacement Project action area.....	59
Table 7. Definition of effect terms (fisheries)	69
Table 8. Summary of past, present, and reasonably foreseeable future actions which may contribute to cumulative effects to aquatic fauna and habitat for all alternatives	86
Table 9. Summary of Effects.....	92
Table 10. Project Effects on ACS Objectives	94
Table 11. Disturbance and Disruption Distances for Northern Spotted Owls	96
Table 12. Approximate Acres Impacted within Territories	97
Table 13. Trails within Project Area	120
Table 14. Consistency with Forest Plan Standards and Guidelines	122
Table 15. Visual Quality Objectives (VQOs 1) by Management Area.....	125
Table 16. Consistency with Forest Plan Standards and Guidelines	128
Table 17. Dog River Head Works Historic District	135
Table 18. Summary of Effects, Dog River Head Works.....	136

Summary

The existing Dog River pipeline, which is an important component of the City of The Dalles' public drinking water supply, was constructed in the early 20th century. It consists of milled pieces of fir that were assembled in a circular shape and wrapped with heavy-gauge galvanized wire and coated with tar. Over the past 100 years, this pipe has deteriorated, is leaking from tree damage, and exhibiting corrosion. Because the pipe is in poor condition, the City of The Dalles has requested the pipeline be replaced with a 24-inch-diameter ductile iron pipe.

The existing pipeline follows topographic contours along a circuitous route around Dog River Mountain to maintain gravity flow. Specifically, the pipeline travels north along the Dog River gauging station access road 4,000 linear feet to Forest Road 44. It traverses to the west and then to the north along the base of Dog River Mountain, approximately 13,700 linear feet. The pipeline then travels 2,000 linear feet through a small hill by way of a 40-foot-deep hand-excavated notch. The pipeline crosses the 1700 road and parallels the existing access road south of the Mill Creek gauging station, where it discharges into the south fork of Mill Creek (Figure 2).

The Dog River water right dates back to 1870 when Certificate No. 14954 was issued to the City of The Dalles for "All the water in stream at point of diversion". The Oregon Water Resources Department Hood River Program (OAR 690 Division 504) states that all water of Dog River above Gauge 1134, located at the Dog River Pipeline intake, is reserved for municipal uses.

The 1912 Cooperative Agreement between the US Secretary of Agriculture and the City of The Dalles states that the purpose of the agreement was "conserving and protecting the water supply" of the city. The 1972 Memorandum of Understanding between the Mt. Hood National Forest USFS, and the City of The Dalles states: "The principle and most important use of this watershed is as a municipal water supply."

The existing Dog River pipeline conveys approximately 54% of the annual water supply for the City of The Dalles.

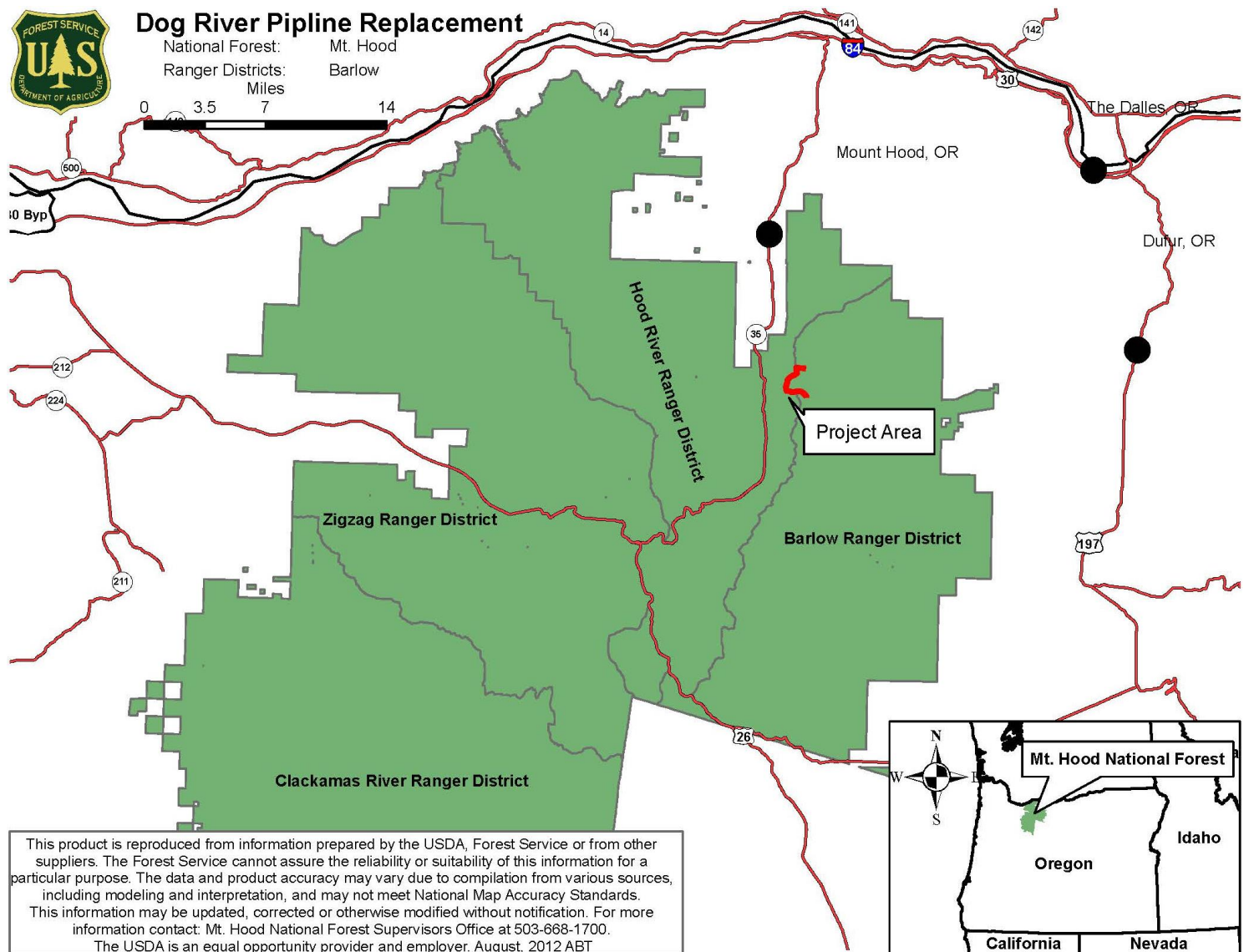
The purpose and need for the Dog River Pipeline Replacement project was developed by comparing the desired future conditions of the pipeline to the pipeline's existing condition and our commitment under an existing Memorandum of Understanding (MOU).

The purpose of this project is to replace the existing Dog River pipeline. There is a need for action because the pipeline has become so deteriorated that it no longer provides the most efficient way of conveying water to the City of The Dalles municipal water supply. Also, there is the need to honor the 1972 MOU between the Mt. Hood National Forest and The Dalles.

The Proposed Action would replace the existing pipeline with a 24-inch-diameter ductile iron pipe. This new pipeline would parallel the alignment of the existing pipeline as much as elevation permits. Existing trees and dead wood would be cut and removed within the 25-foot right of way. The inlet, discharge structure, and flow measuring facilities would also be replaced.

The current diversion from Dog River supplying the existing pipeline is not equipped with fish screens, however, the project proposes to install screens and passage systems on the diversion. The proposed structure would be a screening structure in-channel, keeping the fish in the stream without necessitating any bypass flows.

Figure 1. Vicinity Map of Dog River Pipeline Replacement Planning Area



Chapter 1 – Introduction

The Dog River Pipeline Replacement (DRPR) Project area is located on the Barlow Ranger District of the Mt. Hood National Forest. The existing Dog River pipeline, which conveys approximately 54% of The Dalles' public drinking water supply, was constructed in the early 20th century. It consists of milled pieces of fir that were assembled in a circular shape and wrapped with heavy-gauge galvanized wire and coated with tar. Over the past 100 years, this pipe has deteriorated, is leaking from tree damage, and exhibiting corrosion.

The Forest Service has prepared this Environmental Assessment in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations.

1.1 Document Structure

This Environmental Assessment discloses the direct, indirect, and cumulative environmental effects that would result from the No Action (baseline) and Proposed Action alternatives. The document is organized into four parts:

Introduction: The section includes information on the history of the project proposal, the purpose and need for action, and the agency's proposal for achieving that purpose and need. This section also details the collaboration process among state, local and tribal governments, non-governmental organizations, and interested parties for this project as required by HRFA, as well as how the Forest Service informed the public of the proposal and how the public responded.

Alternatives, including the Proposed Action: This section provides a more detailed description of the No Action and Proposed Action alternatives. This discussion also includes project design criteria and mitigation measures that were added as a result of environmental analysis.

Environmental Consequences: This section describes the environmental effects of the No Action alternative as well as the trade-offs and effects of implementing the Proposed Action alternative. This analysis is organized by resource area. Within each section, the existing environment is described first, followed by the estimated effects of no action that provides a baseline for evaluation, and finally the estimated effects of the Proposed Action alternative.

Consultation and Coordination: This section provides information on agencies consulted during the development of the Environmental Assessment and a list of preparers.

Additional documentation, including more detailed analyses of planning area resources, may be found in the project record located at the Barlow Ranger District Office in Dufur, Oregon.

1.2 Background

The existing Dog River pipeline, which is an important component of The Dalles' public drinking water supply, was constructed in the early 20th century. It consists of milled pieces of fir that were assembled in a circular shape and wrapped with heavy-gauge galvanized wire and coated with tar. Over the past 100 years, this pipe has deteriorated, is leaking from tree damage, and exhibiting corrosion. Because the pipe is in poor condition, the City of The Dalles has requested the pipeline be replaced with a 24-inch-diameter ductile iron pipe.

The existing pipeline follows topographic contours along a circuitous route around Dog River Mountain to maintain gravity flow. Specifically, the pipeline travels north along the Dog River gauging station access road 4,000 linear feet to Forest Road 44. It traverses to the west and then to the north along the base of Dog River Mountain, approximately 13,700 linear feet. The pipeline then travels 2,000 linear feet

through a small hill by way of a 40-foot-deep hand-excavated notch. The pipeline crosses the 1700 road and parallels the existing access road south of the Mill Creek gauging station, where it discharges into the south fork of Mill Creek.

The legal description for the project area is:

Township 1 South, Range 10 East, sec. 34

Township 2 South, Range 10 East, sec. 2, 3, 4, 9, 10, 11; Willamette Meridian

Water Rights and Existing Agreements

The Dog River water right dates back to 1870 when Certificate No. 14954 was issued to the City of The Dalles for “All the water in stream at point of diversion”. The Oregon Water Resources Department Hood River Program (OAR 690 Division 504) states that all water of Dog River above Gauge 1134, located at the Dog River Pipeline intake, is reserved for municipal uses.

The 1912 Cooperative Agreement between the US Secretary of Agriculture and the City of The Dalles states that the purpose of the agreement was “conserving and protecting the water supply” of the city. The 1972 Memorandum of Understanding between the Mt. Hood National Forest USFS, and the City of The Dalles states: “The principle and most important use of this watershed is as a municipal water supply.”

The existing Dog River pipeline conveys approximately 54% of the annual water supply for the City of the Dalles.

1.3 Purpose and Need for Action

The purpose and need for the Dog River Pipeline Replacement project was developed by comparing the desired future conditions of the pipeline to the pipeline’s existing condition and our commitment under an existing Memorandum of Understanding (MOU).

The purpose of this project is to replace the existing Dog River pipeline. There is a need for action because the pipeline has become so deteriorated that it no longer provides the most efficient way of conveying water to the City of The Dalles municipal water supply. Also, there is the need to honor the 1972 MOU between the Mt. Hood National Forest and The Dalles.

1.3.1 Management Direction

The Dog River Pipeline Replacement Project is proposed to meet the desired future condition of the pipeline and to fulfill our commitment under the existing 1972 MOU. This Environmental Assessment has been completed in accordance with direction contained in the National Forest Management Act, the National Environmental Policy Act, the Council on Environmental Quality regulations, Clean Water Act, the Endangered Species Act and other applicable laws, policies and regulations.

This Environmental Assessment is tiered to the Mt. Hood National Forest Land and Resource Management Plan Final Environmental Impact Statement (US Forest Service, 1990b) and Record of Decision (US Forest Service, 1990c), and incorporates by reference the accompanying Forest Plan. The Forest Plan guides all natural resource management activities and establishes management standards and guidelines for the Forest. It describes resource management practices, levels of resource production and management, and the availability and suitability of lands for resource management. Goals, objectives and desired future conditions of the management areas within the planning area are discussed below in the description of land allocations. In addition, management direction for the area is provided in three major Forest Plan amendments:

- The Northwest Forest Plan (NWFP) - Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl and Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl (1994);
- Survey and Manage – Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (2001); and,
- Invasive Plants– Pacific Northwest Invasive Plant Program Preventing and Managing Invasive Plants Record of Decision (2005).

Mt. Hood National Forest Land and Resource Management Plan

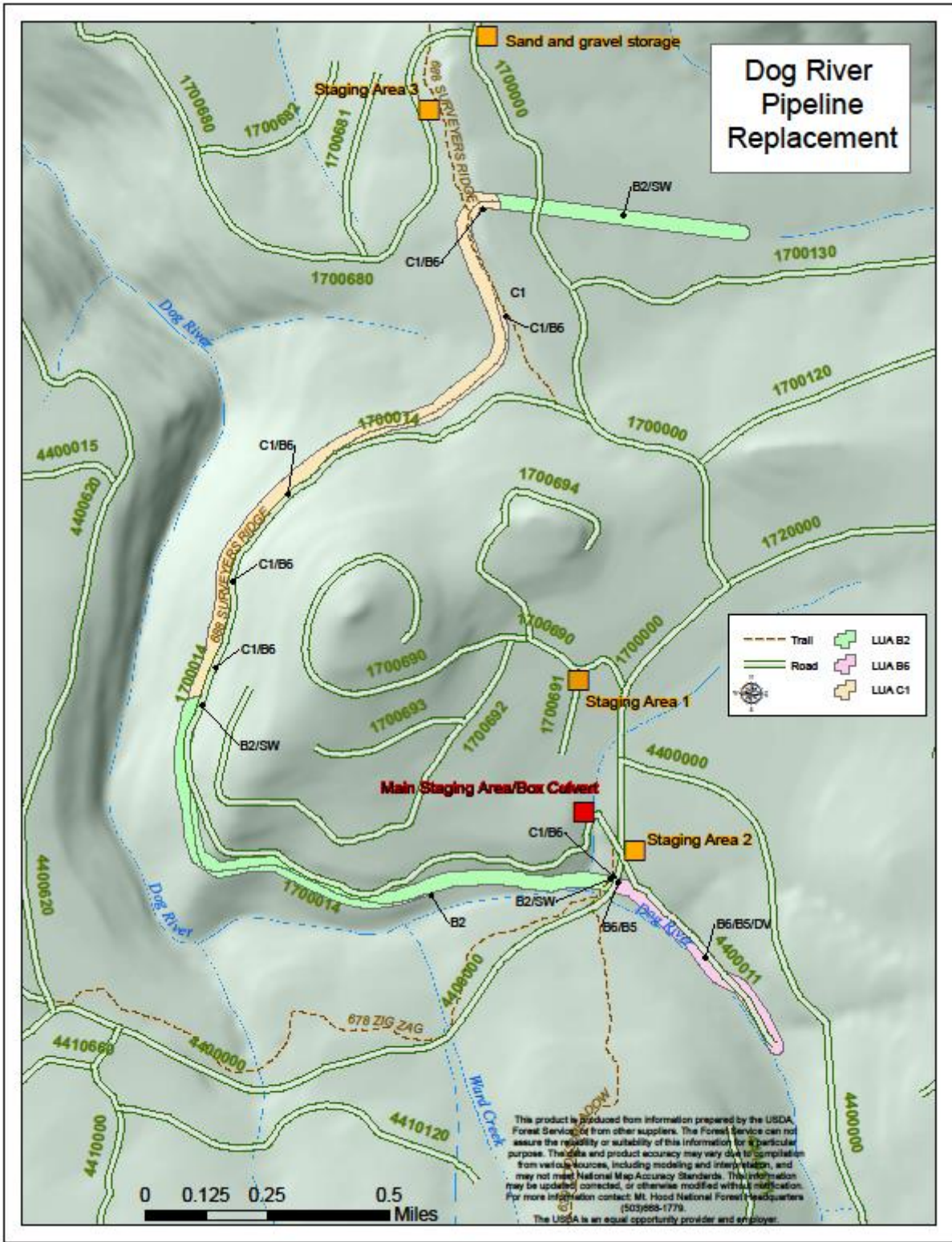
Several land use allocations (LUAs) for NFS lands as designated by the Mt. Hood National Forest Land and Resource Management Plan (Forest Plan), as amended by the Northwest Forest Plan, are found within the planning area. The three primary Forest Plan LUAs in the planning area, are Scenic Viewshed (B2), Special Emphasis Watershed (B6), and Wood Product Emphasis (C1).

B2-Scenic Viewshed LUA, as described by the Forest Plan (pages 4-218 thru 4-220). The goal for this LUA is to provide attractive, visually appealing forest scenery with a wide variety of natural appearing landscape features. The major characteristics are for the visual character of the landscape resulting from prescribed visual quality objectives within distance zones from selected viewer positions. For this project, Dufur Mill Road serves as the main viewer position.

C1-Timber Emphasis LUA is approximately half of the planning area and the main pipe storage areas. The goal for this land is to provide lumber, wood fiber, and other forest products on a fully regulated basis, based on the capability and suitability of the land. A secondary goal is to enhance other resource uses and values that are compatible with timber production (pages 4-289 thru 4-290).

Management area B6-Special Emphasis Watershed (Upper Dog River) (pages 4-246 thru 4-252). The special emphasis watershed in this planning area is the Upper Dog River special emphasis watershed. This watershed was designated for the city of The Dalles Municipal Watershed. The goal of this area is maintain or improve watershed, riparian, and aquatic habitat conditions and water quality for municipal uses and/or long term fish production. A secondary goal is to maintain a healthy forest condition through a variety of timber management practices.

Figure 2. Forest Plan Land Use Allocations within Dog River Pipeline Replacement Planning Area

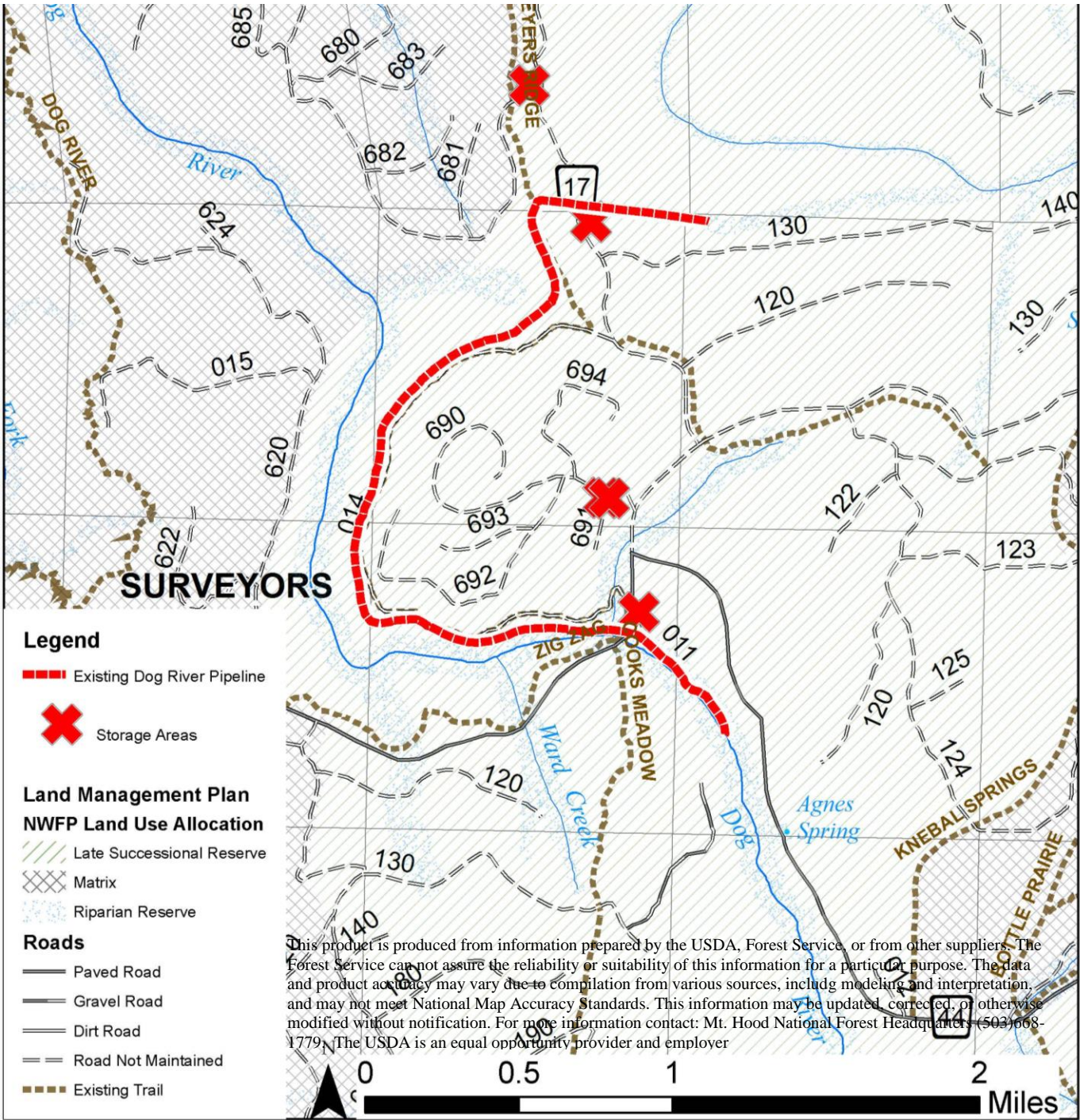


Northwest Forest Plan

The Northwest Forest Plan land use allocations overlap allocations within the Forest Plan. This planning area includes Riparian Reserves and Late-Successional Reserve. Treatments would be located primarily in Late-Successional Reserve, with Riparian Reserves intersecting the pipeline corridor. None of the storage areas would be located within Riparian Reserves. These storage areas would utilize existing clearings and openings present on the landscape. Riparian Reserve includes areas along rivers, streams, wetlands, ponds, lakes, and unstable or potentially unstable areas where the conservation of aquatic and riparian-dependent terrestrial resources receives primary emphasis. Late-Successional Reserves, in combination with other allocations and standards and guidelines, are to maintain a functional, interactive, late-successional and old-growth forest ecosystem.

The Surveyors Ridge LSR Assessment for this area includes The Dalles Municipal Watershed Pipeline Replacement Project as a detailed project proposal. This LSR Assessment states that since the pipe is considered a preexisting structure prior to LSR designation, replacing the pipe should show little or no significant effects to the LSR function and character, except perhaps during the actual construction of the new pipe.

Figure 3. Northwest Forest Plan Land Use Allocations within the Dog River Pipeline Replacement Area



1.4 Proposed Action

The proposed action is to replace the existing pipeline with a new pipeline, allowing the City of The Dalles to fully utilize their water right. In addition to pipeline replacement, the project will repair the diversion structure and install fish screens, install a new culvert at Brooks Meadows Creek, and improve summer low flows by adding 0.5 cfs into Dog River at the point of diversion between September 1st and October 31st.

The Proposed Action would replace the existing 3.4 mile pipeline with a 24-inch-diameter ductile iron pipe. This new pipeline would parallel the alignment of the existing pipeline as much as elevation permits. Existing trees and dead wood would be cut and removed within a 25-foot corridor. Approximately 438 live trees ranging in size from 6" to 48" dbh that will be removed. Of these 438 trees, roughly 12 are larger than 24" dbh, 170 are between 12" and 14" inches, and the remaining trees are 11" and smaller. In addition to the live trees approximately 198 standing dead trees would be cut. Of these, over half are between 11" and 20" inches, roughly 3 are over 30" dbh, 22 between 20" to 30", with the remainder under 11" dbh.

An excavator would dig approximately a 4-foot deep by 3 to 4-foot wide trench, piling the spoils to either side. Gravel or sand would be brought to the excavator by a small rubber-tired or tracked vehicle. The excavator would place the pipe in the trench and then cover the pipe section with gravel or sand and fill in the ditch with the removed spoils. The pipe inlet, discharge structure, and flow measuring facilities would also be replaced. Because the existing pipeline is too fragile to handle surface vehicle traffic, the construction area would be accessed along the newly constructed section of the pipeline. Where the pipeline crosses Brooks Meadows Creek, the pipeline will be buried under the channel and the creek channel would be rehabilitated.

Road 1700-014 would be the access road for the length of the pipeline. This road is currently a rough, natural surface, single lane road that crosses Brooks Meadow Creek at an unimproved ford. The project would install a cement prefabricated open box culvert, eliminating the need for a ford crossing and also improve fish passage. During the culvert construction, the stream would be re-routed around the work area as the culvert is being installed.

There are several staging areas identified for the construction period Figure 2. The main 1 acre staging area would be located at the 1700-014 road at the top of the hill west of the Brooks Meadow Creek Crossing, and would accommodate the transfer of pipe from the primary storage area to the construction area, it will also act as the storage area for the trees/logs removed from the corridor. Minor realignment of the 1700-014 road between Brooks Meadow Creek and the staging area would be completed to allow for construction vehicle traffic. There are several other locations identified for storing pipe and gravel/sand: 1) on either side of the 1700-691 where it intersects with the 1700-690; 2) along road 4400-011 at the junction with road 4400; or, 3) at an old landing off of the 1700. Gravel and sand may also be stored at the junction of the 1700 and the 1700-680 roads Figure 2. All the staging areas will be rehabilitated upon completion of the project.

The existing pipeline would be needed to carry water to the south fork of Mill Creek until the new pipeline is constructed. Therefore, a temporary bypass line would be used to convey water around the construction site. The bypass pipe would consist of an 8-inch aluminum sprinkler-type pipe, which could be moved by hand. Installation of the bypass pipe would be around existing trees, logs, and rock.

An existing section of the pipe, approximately 600 feet long, crosses a draw with a 10-foot fill where Surveyor's Ridge trail leaves the 1700-014. The existing fill would be removed and re-contoured along the draw. The new pipeline would be installed along the contour of the line of the drainage. This could allow drainage in the draw to function naturally.

The current diversion is not equipped with fish screens or a fish ladder. The proposed action would be to install in-channel fish screen and passage structures, keeping the fish in the stream without necessitating any bypass flows. The structure may be designed and constructed in a manner that would allow its removal in the winter.

1.6 Public Involvement

1.6.1 Scoping/Public Involvement

A scoping letter was shared with the public in 2012. In response to this scoping effort, two letters were received. A second scoping letter was then sent to the public in March 2016. Dog River was listed in the Mt. Hood National Forest quarterly planning newsletter (Schedule of Proposed Action [SOPA]) as an ongoing project in spring 2016. Five comments were received during this second public scoping period. The five comments were received from The City of The Dalles, the Confederated Tribes of the Warm Springs, Oregon Wild, the Port of The Dalles, and Dave and Char Corkran.

A collaborative field trip with representative from the National Marine Fisheries Service, City of The Dalles, Confederated Tribes of Warm Springs and the Forest Service visited the Dog River pipeline project on August 26, 2016. The intent of this field trip was to discuss issues and understand the City's operation of the pipeline and diversion.

1.7 Discussion of the concerns raised during scoping

Issues serve to highlight effects or unintended consequences that may occur from the Proposed Action, giving opportunities during the analysis to reduce adverse effects and compare trade-offs for the Responsible Official and public to understand. Issues are best identified during scoping early in the process to help set the scope of the actions, alternatives, and effects to consider; but, due to the iterative nature of the NEPA process, additional issues may come to light at any time. Issues are statements of cause and effect, linking environmental effects to actions, including the Proposed Action (Forest Service Handbook 1909.15, 12.4). Issues are used to generate additional action alternatives to the Proposed Action.

Several concerns and recommendations raised during the scoping and comment periods were addressed as modifications to the Proposed Action, or as changes to the project design criteria. A response to comments document can be found in the project file. The following highlights some of the primary concerns raised by the public and how they have been addressed in this EA. While concerns were expressed from the public, none of these concerns were identified as issues for the purpose of formulating fully developed alternatives.

Water Savings, Flow, Fish passage, and Water temperature

Several comments were surrounding the flow of Dog River; water seepage or loss with existing pipeline, the water savings that results in replacement, fish passage, and water temperature. The following information was prepared in response to those comments.

It is estimated that, at full flows, approximately 1 million gallons per day are currently being lost to leakage. Only the amount of water needed for municipal needs is diverted from Dog River, so during the majority of the year, less water will be diverted from Dog River, leaving additional water in-stream. This could increase spring and early summer streamflow in Dog River up 1.5 cubic feet per second. An arch culvert would be permanently installed at Brooks Meadow Creek to improve passage for fish and other

aquatic animals both during and after construction. In addition to the new pipeline, several other components of the project will be implemented to improve aquatic and semi-aquatic organism passage. This includes a screen and passage system at the current point of diversion, as well as the installation of an AOP culvert at the existing ford on Brooks Meadow Creek and the 1700-014 Road. The new pipeline is not proposing to introduce warm water into Brooks Meadow Creek.

Foot Print, and Impact to Wildlife

A few commenters were concerned with the footprint of the project more specifically potential expansion, and the impact the project and new pipeline would have on wildlife. The following information was generated to address these comments.

The project is looking to keep the footprint of the project to a minimum and utilize the pipelines existing corridors and previously disturbed areas as much as possible. The project will keep the disturbance footprint to a minimum to achieve the projects goals of pipeline replacement. Additional PDCs have been developed to improve wildlife habitat by leaving large trees that need to be removed on the ground in sufficient quantity to serve wildlife needs. To minimize the potential impacts to the land, while utilizing the gravity flow method of operation, the new alignment would parallel the alignment of the existing pipeline as much as elevation permits. While this corridor is existing, a lack of previous maintenance has allowed the corridor to become thick with vegetation that needs to be removed for the project to be implemented. The full effects analysis for all affected areas will be completed in the EA.

Financial

Several commenters were interested in if public funds would be used, and what the funding source would be. The following information was generated to address these comments.

The city is using user generated monies to fund the pipeline replacement while also investing supplemental funding options. At this point there have been no grants or other public or federal dollars used for the planning or implementation of this project.

Chapter 2 – Alternatives

This chapter is intended to describe the alternatives and how they were formulated for the Dog River Pipeline Replacement Project. This chapter provides readers and the Responsible Official with a description of the Proposed Action components, project design criteria/mitigation measures, monitoring requirements, and regulatory framework. Two alternatives were considered: the no action alternative and the Proposed Action alternative. No other alternatives were considered for this project.

2.1 No Action Alternative

Under the No Action alternative, current management plans would continue to guide management of the area. The existing pipeline would remain in place and would continue to degrade and leak approximately 1 million gallons-per-day during certain portions of the year. Additionally, the current diversion would remain in place, and no fish screens or ladders would be installed. This diversion would continue to serve as a barrier to aquatic and semi-aquatic fish passage.

In the long term, the pipeline would continue to degrade and would likely lose additional water as growing vegetation would continue to compromise the integrity of the wooden pipeline. At some point,

the pipeline may suffer a catastrophic failure and no longer provide the City of The Dalles with approximately 50% of their municipal water supply.

The No Action alternative would not repair any crossings, and the unimproved ford crossing at Brooks Meadow Creek would remain in place. The current use pattern and crossing would not change, and the unimproved crossing would continue to serve as a potential barrier to aquatic and semi-aquatic organisms. Administrative use on this system would not change. No action would mean that current minimal road maintenance would occur, and no road reconstruction would occur.

2.2 Proposed Action Alternative

The proposed action is to replace the existing pipeline with a new pipeline, allowing the City of The Dalles to fully utilize their water right. In addition to pipeline replacement, the project will repair the diversion structure and install fish screens, install a new culvert at Brooks Meadows Creek, and improve summer low flows by adding 0.5 cfs into Dog River at the point of diversion between September 1st and October 31st.

The Proposed Action would replace the existing 3.4 mile pipeline with a 24-inch-diameter ductile iron pipe. This new pipeline would parallel the alignment of the existing pipeline as much as elevation permits. Existing trees and dead wood would be cut and removed within a 25-foot corridor. Approximately 438 live trees ranging in size from 6" to 48" dbh that will be removed. Of these 438 trees, roughly 12 are larger than 24" dbh, 170 are between 12" and 14" inches, and the remaining trees are 11" and smaller. In addition to the live trees approximately 198 standing dead trees would be cut. Of these, over half are between 11" and 20" inches, roughly 3 are over 30" dbh, 22 between 20" to 30", with the remainder under 11" dbh.

An excavator would dig approximately a 4-foot deep by 3 to 4-foot wide trench, piling the spoils to either side. Gravel or sand would be brought to the excavator by a small rubber-tired or tracked vehicle. The excavator would place the pipe in the trench and then cover the pipe section with gravel or sand and fill in the ditch with the removed spoils. The pipe inlet, discharge structure, and flow measuring facilities would also be replaced. Because the existing pipeline is too fragile to handle surface vehicle traffic, the construction area would be accessed along the newly constructed section of the pipeline. Where the pipeline crosses Brooks Meadows Creek, the pipeline will be buried under the channel and the creek channel would be rehabilitated.

Road 1700-014 would be the access road for the length of the pipeline. This road is currently a rough, natural surface, single lane road that crosses Brooks Meadow Creek at an unimproved ford. The project would install a cement prefabricated open box culvert, eliminating the need for a ford crossing and also improve fish passage. During the culvert construction, the stream would be re-routed around the work area as the culvert is being installed.

There are several staging areas identified for the construction period Figure 2. The main 1 acre staging area would be located at the 1700-014 road at the top of the hill west of the Brooks Meadow Creek Crossing, and would accommodate the transfer of pipe from the primary storage area to the construction area, it will also act as the storage area for the trees/logs removed from the corridor. Minor realignment of the 1700-014 road between Brooks Meadow Creek and the staging area would be completed to allow for construction vehicle traffic. There are several other locations identified for storing pipe and gravel/sand: 1) on either side of the 1700-691 where it intersects with the 1700-690; 2) along road 4400-011 at the junction with road 4400; or, 3) at an old landing off of the 1700. Gravel and sand may also be stored at the junction of the 1700 and the 1700-680 roads Figure 2. All the staging areas will be rehabilitated upon completion of the project.

The existing pipeline would be needed to carry water to the south fork of Mill Creek until the new pipeline is constructed. Therefore, a temporary bypass line would be used to convey water around the

construction site. The bypass pipe would consist of an 8-inch aluminum sprinkler-type pipe, which could be moved by hand. Installation of the bypass pipe would be around existing trees, logs, and rock.

An existing section of the pipe, approximately 600 feet long, crosses a draw with a 10-foot fill where Surveyor's Ridge trail leaves the 1700-014. The existing fill would be removed and re-contoured along the draw. The new pipeline would be installed along the contour of the line of the drainage. This could allow drainage in the draw to function naturally.

The current diversion is not equipped with fish screens or a fish ladder. The proposed action would be to install in-channel fish screen and passage structures, keeping the fish in the stream without necessitating any bypass flows. The structure may be designed and constructed in a manner that would allow its removal in the winter.

2.3 Project Design Criteria/Mitigation Measures

The National Environmental Policy Act defines "mitigation" as avoiding, minimizing, rectifying, reducing, eliminating or compensating project impacts. The following project design criteria (PDCs), best management practices (BMPs), and mitigation measures are an integral part of this project and would be carried out if the project is implemented under the Proposed Action. BMPs are specified in *The National Best Management Practices for Water Quality Management on National Forest System Lands - Volume 1: National Core BMP Technical Guide* (April 2012). The effects analysis in Chapter 3 is based on these PDCs, BMPs, and mitigation measures being implemented.

2.3.1 Aquatic Conservation Measures

2.3.1.1. Technical Skill and Planning Requirements

- A. Any project element that will be designed or implemented by the City of The Dalles or their designee (contractor) must be reviewed by qualified USFS staff (e.g. fish biologist, hydrologist, engineer, silviculturalist, fire/fuels specialists). A USFS fisheries biologist or hydrologist will be involved in the planning and design review of all instream elements of the project covered by the Dog River Pipeline Replacement Project EA. For all contracted work, planning and design includes field evaluations and site-specific surveys, which may include reference-reach evaluations that describe the appropriate geomorphic context in which to implement the project.
- B. The Forest Service Permit Administrator or their designee would monitor the implementation of the PDCs during construction and operations on a regular basis and will have the authority to provide direction and/or take action if construction or operations are not conducted according to the project design criteria.

2.3.1.2 In-water Work Period

- A. Follow the appropriate state (ODFW 2008) or most recent guidelines for timing of in-water work (July 15-August 30). The Action Agencies will request exceptions to in-water work windows through Level 1 NMFS or USFWS representatives as well as essential State agencies. NMFS branch chiefs and USFWS Division Managers or Field Office Supervisors will authorize variances to in-water work periods.

2.3.1.3 Fish Passage

- A. Fish passage will be provided for any adult or juvenile fish likely to be present in the action area during construction. Temporary stream isolation and dewatering at Brooks Meadow will be necessary and will follow fish capture and release described below. After construction, adult and juvenile passage that meets ODFW's fish passage criteria will be provided for the life of the project.

2.3.1.4 Pollution and Erosion Control Measures

- A. Project Contact: Identify a project contact (name, phone number, an address) that will be responsible for implementing pollution and erosion control measures.
- B. List and describe any hazardous material that would be used at the project site, including procedures for inventory, storage, handling, and monitoring; notification procedures; specific clean-up and disposal instructions for different products available on the site; proposed methods for disposal of spilled material; and employee training for spill containment.
- C. Temporarily store any waste liquids generated at the staging areas under cover on an impervious surface, such as tarpaulins, until such time they can be properly transported to and treated at an approved facility for treatment of hazardous materials.
- D. Procedures based on best management practices to confine, remove, and dispose of construction waste, including every type of debris, discharge water, concrete, cement, grout, washout facility, welding slag, petroleum product, or other hazardous materials generated, used, or stored on-site.
- E. Procedures to contain and control a spill of any hazardous material generated, used or stored on-site, including notification of proper authorities. Ensure that materials for emergency erosion and hazardous materials control are onsite (e.g., silt fence, straw bales, oil-absorbing floating boom whenever surface water is present).
- F. Best management practices to confine vegetation and soil disturbance to the minimum area, and minimum length of time, as necessary to complete the action, and otherwise prevent or minimize erosion associated with the action area.
- G. No uncured concrete or form materials will be allowed to enter the active stream channel.
- H. Steps to cease work under high flows, except for efforts to avoid or minimize resource damage.
- I. Ensure pipeline is fabricated from materials meeting ODEQ standards for water quality.
- J. Use suitable measures at the pipeline outlet to avoid or minimize erosion downstream of the structure when design flows are released.

2.3.1.5 Site Preparation

- A. Flagging Sensitive Areas – Prior to construction, clearly mark critical riparian vegetation areas, wetlands, and other sensitive sites to minimize ground disturbance.

- B. Staging Area – Establish staging areas for storage of vehicles, equipment, and fuels to minimize erosion into or contamination of streams and floodplains.
- C. No Topographical Restrictions – place staging area 150 feet or more from any natural water body or wetland in areas where topography does not restrict such a distance.
- D. Topographical Restrictions –place staging area away from any natural water body or wetland to the greatest extent possible in areas with high topographical restriction, such as constricted valley types.
- E. Temporary Erosion Controls – Place sediment barriers prior to construction around sites where significant levels of erosion may enter the stream directly or through road ditches. Temporary erosion controls will be in place before any significant alteration of the action site and will be removed once the site has been stabilized following construction activities.
- F. Stockpile Materials – Minimize clearing and grubbing activities when preparing staging, project, and or stockpile areas. Any large wood, topsoil, and native channel material displaced by construction will be stockpiled in a previously disturbed site as feasible for use during site restoration. Materials used for implementation of aquatic restoration categories (e.g., large wood, boulders, fencing material) may be staged within the 100-year floodplain.
- G. Hazard Trees within riparian areas – Where appropriate, include hazard tree removal (amount and type) in project design. Fell hazard trees when they pose a safety risk. If possible, fell hazard trees within riparian areas towards a stream. Keep felled trees on site when needed to meet coarse large wood objectives.

2.3.1.6 Heavy Equipment Use

- A. Choice of Equipment – Heavy equipment will be commensurate with the project and operated in a manner that minimizes adverse effects to the environment (e.g., minimally-sized, low pressure tires, minimal hard turn paths for tracked vehicles, temporary mats or plates within wet areas or sensitive soils).
- B. Fueling and Cleaning and Inspection for Petroleum Products
 - a. All equipment used for instream work will be cleaned for petroleum accumulations, dirt, plant material (to prevent the spread of noxious weeds), and leaks repaired prior to entering the project area. Such equipment includes large machinery, stationary power equipment (e.g., generators, canes, etc.), and gas-powered equipment with tanks larger than five gallons.
 - b. Store and fuel equipment in staging areas after daily use.
 - c. Inspect daily for fluid leaks before leaving the vehicle staging area for operation.
 - d. Thoroughly clean equipment before operation below ordinary high water or within 50 feet of any natural water body or areas that drain directly to streams or wetlands and as often as necessary during operation to remain grease free.
- C. Temporary Access Points – Existing roadways will be used whenever possible. Minimize the number of temporary access points and travel paths to lessen soil disturbance and compaction and impacts to vegetation. When necessary, temporary access points will be decompacted and/or revegetated. Temporary points in wet or flooded areas will be restored by the end of the applicable in-water work period.

- D. Streams, Riparian Areas and Wet Areas – Minimize disturbance in streams, riparian areas and wet areas. Minimize number and length of stream crossings. Such crossings will be at right angles and avoid potential spawning areas to the greatest extent possible. Stream crossings shall not increase the risk of channel re-routing at low and high water conditions. After project completion, temporary stream crossings will be abandoned and the stream channel and banks restored. Access, staging and stream crossing locations will be identified by hydro/fisheries prior to implementation
- E. Work from Top of Stream Bank for Instream Work – To the extent feasible, heavy equipment will work from the top of the bank, unless work from another location (instream) would result in less habitat disturbance, less floodplain disturbance, less sediment in the stream channel, or less damage to the overall aquatic and riparian ecosystem.
- F. Timely Completion – Minimize time in which heavy equipment is in stream channels, riparian areas, and wetlands. Complete earthwork (including drilling, excavation, dredging, filling and compacting) as quickly as possible. During excavation, stockpile native streambed materials above the bankfull elevation, where it cannot reenter the stream, for later use.

2.3.1.7 Site Restoration

- A. Initiate Rehabilitation – Upon project completion, rehabilitate all disturbed areas in a manner that results in similar or better than pre-work conditions through removal from the National Forest of project related waste, spreading of non-vegetation stockpiled materials (soil, etc.) seeding, or planting with local native seed mixes or plants and restoration of stream channel bed and banks.
- B. Short-term Stabilization – Measures may include the use of Forest Service approved materials, weed-free certified straw, jute matting, and other similar techniques. Short-term stabilization measures will be maintained until permanent erosion control measures are effective. Stabilization measures will be instigated within three days of construction completion.
- C. Decompact Soils – Excess materials should be stockpiled at an approved site, or dispersed and decompacted by scarifying the soil surface of roads and paths, stream crossings, staging, and stockpile areas so that seeds and plantings can root. FS will review and approve the need to disperse or stockpile excess material.
- D. Pipeline Stream Crossing – Restore stream channel to pre-construction conditions.

2.3.1.8 Monitoring

Monitoring will be conducted by USFS staff, as appropriate for the project, during and after the project to track effects and compliance with this Dog River Pipeline Replacement Project EA.

- A. Implementation
 - a. Visually monitor during project implementation to ensure effects are not greater (amount, extent) than anticipated.
 - b. Fix any problems that arise during project implementation.
 - c. Regular biologist/hydrologist coordination if biologist/hydrologist is not always on site to ensure contractor is following all stipulations.

- B. 401 Certification – To minimize short-term degradation to water quality during project implementation, follow current 401 Certification provisions of the Federal Clean Water Act for maintenance of water quality standards
- C. Post Project – A post-project review shall be conducted after winter and spring high flows. Adaptively manage for substantial deficiencies identified during monitoring (i.e. adding large wood to the outlet channel of South Fork Mill Creek).
 - a. For each project, conduct a walk through/visual observation to determine if there are post-project affects that were not considered during planning. For fish passage and revegetation projects, monitor in the following manner:
 - b. Fish Passage Projects – Note any problems with channel scour or bedload deposition, substrate, discontinuous flow
 - c. Dog River Pipeline Outlet downstream to Crow Creek Reservoir (South Fork Mill Creek) – Monitor for any problems associated with additional flow (e.g. channel scour).
 - d. Headcut Stabilization – Monitor headcut stabilization sites for effectiveness (e.g. scour or evidence of further headcutting).

2.3.1.9 Installation of AOP and Pipeline Crossing at Brooks Meadow Creek

- A. The culvert design and pipeline crossing at Brooks Meadow shall be reviewed by an interdisciplinary design team consisting of an experienced Engineer, Fisheries Biologist, and/or Hydrologist/Geomorphologist. If the culvert is wider than 20 feet or the cost exceeds \$100,000, it shall be reviewed by the USDA-Forest Service, Region 6, Aquatic Organism Passage Design Assistance Team.
- B. All road-stream crossing structures shall simulate stream channel conditions per Stream Simulation: An Ecological Approach to Providing Passage for Aquatic Organisms at Road- Stream Crossings (USDA-Forest Service 2008a), located at: http://stream.fs.fed.us/fishxing/aop_pdfs.html. Within the considerations of stream simulation, the structure shall, at a minimum, accommodate a bankfull wide channel plus constructed banks to provide for passage of all life stages of native fish species (for more information, reference Chapter 6, page 35 of the USFS Stream Simulation Guide). The following crossing-width guidance applies to specific ranges of entrenchment ratios as defined by Rosgen (1996):
 - a. Non-entrenched Streams: If a stream is not fully entrenched (entrenchment ratio of greater than 1.4), the minimum culvert width shall be at least 1.3 times the bankfull channel width. This is consistent with Anadromous Salmonid Passage Facility Design (section 7.4.2 “Stream Simulation Design”). (NMFS 2011e) However, if the appropriate structure width is determined to be less than 1.3 times the bankfull channel width.
 - b. Entrenched Streams: If a stream is entrenched (entrenchment ratio of less than 1.4), the culvert width must be greater than bankfull channel width, allow sufficient vertical clearance to allow ease of construction and maintenance activities, and provide adequate room for the construction of natural channel banks. Consideration should be given to accommodate the flood-prone width. Flood-prone width is the width measured at twice the maximum bankfull depth (Rosgen 1996).

- c. Bankfull width shall be based on the upper end of the distribution of bankfull width measurements as measured in the reference reach to account for channel variability and dynamics.
- C. Headcut and Grade Stabilization – Headcuts often occur in meadow areas, typically on Rosgen “C” and “E” channel types. Headcuts develop and migrate during bankfull and larger floods, when the sinuous path of Rosgen E type streams may become unstable in erosive, alluvial sediments, causing avulsions, meander cut-offs, bank failure, and development of an entrenched Rosgen G gully channel (Rosgen 1994). These stabilization BMPs would apply during project -activities in the vicinity of the stream crossing replacement location and at the pipeline stream crossing location.
 - a. Armor headcut with sufficiently sized and amounts of material to prevent continued up-stream migration of the headcut. Materials can include both rock and organic materials which are native to the area. Material shall not contain gabion baskets, sheet pile, concrete, articulated concrete block, and cable anchors.
 - b. Focus stabilization efforts in the plunge pool, the headcut, as well as a short distance of stream above the headcut.
 - c. Minimize lateral migration of channel around headcut (“flanking”) by placing rocks and organic material at a lower elevation in the center of the channel cross section to direct flows to the middle of channel.
 - d. Short-term headcut stabilization (including emergency stabilization projects) may occur without associated fish passage measures. However, fish passage must be incorporated into the final headcut stabilization action and be completed during the first subsequent in- water work period.
- D. Isolate the construction area and remove fish from the project site.
 - a. Isolate capture area – Install block nets at up and downstream locations outside of the construction zone to exclude fish from entering the project area. Leave nets secured to the stream channel bed and banks until construction activities within the stream channel are complete. If block nets or traps remain in place more than one day, monitor the nets and or traps at least on a daily basis to ensure they are secured to the banks and free of organic accumulation and to minimize fish predation in the trap.
 - b. Capture and release – Fish trapped within the isolated work area will be captured and released as prudent to minimize the risk of injury, then released at a safe release site, preferably upstream of the isolated reach in a pool or other area that provides cover and flow refuge. Collect fish in the best manner to minimize potential stranding and stress by seine or dip nets as the area is slowly dewatered, baited minnow traps placed overnight, or electrofishing (if other options are ineffective). Fish must be handled with extreme care and kept in water the maximum extent possible during transfer procedures. A healthy environment for the stressed fish shall be provided— large buckets (five-gallon minimum to prevent overcrowding) and minimal handling of fish. Place large fish in buckets separate from smaller prey-sized fish. Monitor water temperature in buckets and well-being of captured fish. If buckets are not being immediately transported, use aerators to maintain water quality. As rapidly as possible, but after fish have recovered, release fish. In cases where the stream is intermittent upstream, release fish in downstream areas and away from the influence

of the construction. Capture and release will be supervised by a fishery biologist experienced with work area isolation and safe handling of all fish.

- c. Electrofishing – Use electrofishing only where other means of fish capture may not be feasible or effective. If electrofishing will be used to capture fish for salvage, NMFS's electrofishing guidelines will be followed (NMFS 2000).¹¹ Reasonable effort should be made to avoid handling fish in warm water temperatures, such as conducting fish evacuation first thing in the morning, when the water temperature would likely be coolest. No electrofishing should occur when water temperatures are above 18°C or are expected to rise above this temperature prior to concluding the fish capture.
- E. Dewater Construction Site –When dewatering is necessary, divert flow around the construction site with a coffer dam (built with non-erosive materials), taking care to not dewater downstream channels during dewatering. Pass flow downstream with a by-pass pipe large enough to handle the diverted flow. Small amounts of instream material can be moved to help seal and secure diversion structures. If pumps are used to dewater, the intake must have a fish screen(s) and be operated in accordance with ODFW fish screen criteria. Dissipate flow energy at the bypass outflow to prevent damage to riparian vegetation or stream channel. Pump seepage water from the de-watered work area to a temporary storage and treatment site or into upland areas and allow water to filter through vegetation prior to reentering the stream channel.
- F. Stream Re-watering – Upon project completion, slowly re-water the construction site to prevent loss of surface water downstream as the construction site streambed absorbs water and to prevent a sudden release of suspended sediment. Monitor downstream during re-watering to prevent stranding of aquatic organisms below the construction site.

2.3.1.10 Head-gate Diversion Replacement/Relocation & Screen Installation/Replacement

- A. ODFW Fish Passage Review and Approve – The USFS will ensure that the action is individually reviewed and approved by ODFW for consistency with fish passage criteria. This applies across the action area.
- B. Diversion structures—associated with points of diversion and future fish screens—must pass all life stages of threatened and endangered aquatic species that historically used the affected aquatic habitat.
- C. Water diversion intake and return points must be designed (to the greatest degree possible) to prevent all native fish life stages from swimming or being entrained into the diversion.
- D. All fish screens will be sized to match the user's state water right or estimated historic water use, whichever is less.
- E. Abandoned ditches and other similar structures will be plugged or backfilled, as appropriate, to prevent fish from swimming or being entrained into them.
- F. When making improvements to pressurized diversions, install a totalizing flow meter capable of measuring rate and duty of water use. For non- pressurized systems, install a staff gage or other measuring device capable of measuring instantaneous rate of water flow.
- G. Do not flush or otherwise move sediment from behind diversion structure downstream. Deposit and stabilize sediment removed from behind diversion structure in a suitable designated upland site.

2.3.2 Transportation/Engineering

2.3.2.1. 4400 Road:

- A. After saw cutting pavement to replace new pipeline, rebuild sub-grade and sub-base in 6" lifts to match existing asphalt.

2.3.2.2 4400011 Road:

- A. Clear road of obstacles and danger trees where needed to provide safe passage for planned vehicles.
- B. If road is to be used in the wet season, surface road with 3"(-) aggregate or other surfacing material to minimize sediment flows.
- C. Clean culverts and, or slope the road to drain, or install water bars to help drain surface and reduce sediment flows.

2.3.2.3 1700 Road:

- A. At new pipeline crossing rebuild sub-grade with 6" lifts, roll or compact and reestablish surface course.
- B. Clean existing 18" CMP at pipeline crossing if needed.
- C. Improve existing pipeline maintenance road along pipeline that starts at this point and runs into Dalles Watershed.

2.3.2.4 1700690 Road:

- A. Blade road to drain and replace surface material when needed to reduce dust and sediment flows.

2.3.2.5 1700014 Road:

- A. Place, roll and compact 3/4"(-) aggregate material 100' each direction of road crossing at Brooks Meadow Creek to minimize the delivery of sediment erosion to the stream.
- B. If road is to be used in the wet season surface portions of the road that have a native soil surface with 3"(-) aggregate or other surfacing material.
- C. Clear road of obstacles and danger trees where needed to provide safe passage for planned vehicles.
- D. Turnouts located approximately every 1000'.
- E. Slope road to drain or install water bars to reduce sediment flows.

2.3.2.6 Staging areas:

- A. Place 6" minimum compacted (8"-10" loose) aggregate base at Primary Pipe Storage areas. Turn around areas would be required to have compacted aggregate base.

Miscellaneous:

- A. If the access roads are to be used in the winter by wheeled vehicles, a snow plow permit would be required by the Forest Service and approved and signed by the District Ranger. Check with Director of public works about winter operations.

- B. A Forest Service Road Use Permit may be required for maintenance and repair of damaged Forest System Roads used for this project.
- C. FS Engineering review of final plans prior to implementation

2.3.3 Wildlife

- A. If a spotted owl nest is found, there would be timing restrictions between March 1 and July 15 for all activities within 65 yards of the owl nest patch.
- B. Leave 5% of the largest felled trees (live or dead) on the site with even distribution and species selected for habitat considerations. Boles should be limbed and piled.

2.3.4 Fuels

- A. All activity created slash will be piled outside of riparian areas.
- B. Slash piles should have a sound base to prevent toppling over and should be wider than they are tall. Pile branches with their butt-ends toward the outside of the pile, and overlap them so as to form a series of dense layers piled upon each other. Use a mixture of sizes and fuels throughout the pile. There should be no long extensions protruding from the piles. Do not construct piles on stumps or on sections of large down logs.
- C. Any mechanical slash piling would be done with equipment capable of picking up (grasping) slash material and piling (as opposed to pushing/dozing). Piles need to be 8-feet wide at base, 6-feet high as a minimum. An allowance for a small deviation from the stated dimensions would be made as long as this deviation does not jeopardize meeting any other stated goals. Any piling of slash will be kept separate from the chip material.
- D. Hand piles would be constructed with enough fine fuels to allow for ignition during fall and winter months, and covered, to facilitate consumption of piled fuels. Piles need to be 8-feet wide at base, 6-feet high as a minimum. An allowance for a small deviation from the stated dimensions would be made as long as this deviation does not jeopardize meeting any other stated goals.
- E. Piles should be as compact and free of dirt as possible.
- F. Pile size and location should be such to minimize damage to residual trees. Piles should be located at least 20-feet inside the unit boundary when there is sufficient unit size to do so. Piles should not be placed on or in the following areas: pavement, road surface, ditch lines, or within 100-feet of a stream course.
- G. Pile would be burned two years after contract termination.
- H. All boles remaining on site would be limbed and material would be piled.

2.3.5 Recreation

- A. An extension to the Super Connector Trail, which connects the Surveyors Ridge Trail to the Knebel Trail, would be completed prior to the beginning of implementation to allow trail users to utilize the portion of Surveyors Ridge Trail North of the pipeline replacement and maintain interconnectivity with the rest of the trail system.
- B. The Surveyors Ridge Trail would be closed for as little time as possible understanding that closure due to safety concerns and the need for new construction is necessary. Pipeline replacement construction timing across the Surveyors Ridge Trail would be coordinated with Recreation to reduce impacts during times of high usage.
- C. The City of The Dalles would work with the recreation specialist to develop public information materials and outreach plan using a combination of key entry/exit portals, visitor information boards and outreach via websites and other information sources.
- D. The public would be notified of trail closures as early as possible utilizing signs at trail heads as well as media outlets such as newspapers and websites. Trail closures would be posted no later than two weeks before the closure would occur.

2.3.6 Visuals

- A. The pipeline corridor would be visually subordinate along Forest Road 44. As many trees as possible would be retained along the Forest Road 44 corridor to maintain a visual buffer between the road and the pipeline corridor.
- B. Piles would be visually subordinate along the pipeline corridor adjacent to Forest Road 44. They would be burned within 2 years of contract termination.
- C. Tree stumps would be maintained at heights of 6 inches or less within the foreground (up to ½ mile) and be angled away from the roadway to meet Retention standards adjacent to Forest Road 44.
- D. Tree paint and boundary flagging would not be marked facing the roadway along Forest Road 44.

2.3.7 Soils

- A. All disturbed ground, including temporary storage and access points would use erosion control measures. A qualified specialist would monitor disturbed areas, as needed, to verify that erosion controls are implemented and functioning as designed and are suitably maintained. Due to the rating of Moderate Compaction Hazard, a minimum of 60% effective groundcover is required before the first overwintering period.

2.3.8 Invasive

- A. Incorporate the standard contract provision that require cleaning of equipment. In order to prevent the spread of invasive plants, all equipment would be cleaned of dirt and weeds before entering National Forest System lands. This practice would not apply to service vehicles traveling frequently in and out of the project area that would remain on the roadway.

- B. The process for locating all landings or stockpile locations would be coordinated with a noxious weed specialist to insure these locations are not within any currently established noxious weed populations. If necessary, pre-treat existing landings and skid trails that may be used for project implementation where existing infestations present an unacceptable risk of spreading established invasive plant populations.
- C. Inspect active gravel, fill, sand stockpiles, quarry sites, and borrow material for invasive plants before use and transport. Treat or require treatment of infested sources before any use of pit material. Use only gravel, fill, sand, and rock that is judged to be weed free by District or Forest weed specialists.

2.3.9 Heritage

- A. Under continuing consultation and approval of Mt Hood National Forest Heritage Program, install interpretive signs describing the history of the Dog River aqueduct along the Surveyor's Ridge and Cook's Meadow Trails.
- B. Avoid Surveyor's Rock, located in the Hood River Ranger District adjacent to N-107 and along an access route to the Dog River Diversion Line and located in the North ½ Section 3, T2s, R10E.
- C. Under continuing consultation and approval of the Mt Hood National Forest Heritage Program, repair and stabilize the Dog River Headworks Log Cabin. This may include amendments to and repair of the foundation, excavating the hill slope away from the cabin, leveling the cabin, replacing deteriorating logs, and re-shingling the roof with cedar shakes.
Or;
 - a. Repair the cabin and place it on a new foundation set back from the access road to protect it from traffic damage.
 - b. Repair the cabin, transport it to The Dalles, and place it on a new foundation in a city park.
 - c. File a copy of this report and site forms with the Wasco County Museum and the Hood River County Museum on archival paper.
- D. If previously unidentified cultural resources are encountered during project implementation, all work in the area must stop, and the Heritage Program Manager or District Archaeologist must be notified immediately.

2.3.10 Water Quantity

- A. Maintain 0.5 cfs (or entirety of flow if below 0.5cfs) bypass flow of water in stream at the point of diversion between September 1 to October 31

Chapter 3 – Environmental Consequences

This chapter presents information on the physical, biological, social, and economic environments of the affected planning area, and the potential direct, indirect and cumulative effects to those environments due to the implementation of the alternatives. Each resource area discloses the direct, indirect and cumulative effects for that resource area. The National Environmental Policy Act defines these as:

- **Direct:** Effects which are caused by the action and occur at the same time and place
- **Indirect:** Effects which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable
- **Cumulative:** Impacts that result from the incremental impact of an action, when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions

The Environmental Assessment hereby incorporates by reference the project record (40 CFR 1502.21). The project record contains specialist reports, biological evaluations, and other technical documentation used to support the analysis and conclusions in this Environmental Assessment. Specialist reports, which are incorporated by reference, were completed for vegetation resources, transportation resources, soils, water quality, fisheries, wildlife, botany, invasive plants, recreation, visual quality, and heritage resources. Separate biological evaluations were completed for botanical species, aquatic species, and terrestrial wildlife species. Also, a biological assessment was completed for fisheries. Full versions of these reports are available in the project record, located at the Hood River Ranger District office in Mt. Hood/Parkdale, Oregon.

Each of the specialist reports and biological evaluations conduct an analysis of cumulative effects resulting from this project.

Table 1. Projects that the IDT considered in their analysis.

Past Activities
The Dalles Watershed Phase I and II Fuel Reduction
Timber harvests on federal, county and private lands (including associated road/landing construction)
Road decommissioning and road closures
Aquatic Restoration projects
Cooks Meadow Trail Relocation
Ongoing Activities
The Dalles Watershed Fuel Reduction
Timber harvests on federal, county and private lands (including associated road/landing construction)
Road decommissioning and road closures
Dog River Pipeline Ongoing Operations
Pre-commercial Thinning
Dog River Trail Relocation CE
National Forest System Road and Trail maintenance
Site-Specific Noxious Weed Treatments
Surveyors Ridge Trail Relocation
Surveyors Ridge Trail Maintenance
Highway 35 road maintenance and sanding
Dufur Mill Road (4400) maintenance
Snowmobile use

Developed and dispersed campsites
Future Activities
Timber harvests on federal, county and private lands (including associated road/landing construction)
The Dalles Watershed Fuel Reduction
Re-issuance of the Dalles Watershed Special Use Permits

3.1 Vegetation Resources

3.1.1 Existing Condition

The proposed project area is dominated by three plant associations, Grand fir (*Abies grandis*)/vine maple (*Acer circinatum*)/vanilla leaf (*Achlys triphylla*) (A1), Grand fir/queencup beadlily (*Clintonia uniflora*) (A2), and grand fir/vanilla leaf (A3). Common to the moist mix conifer plant associations (A1, A2, and A3) the overstory would be dominated by Douglas-fir (*Pseudotsuga menziesii*), grand fir, and ponderosa pine (*Pinus ponderosa*) and the understory would be dominated by a variety of shrubs like Oregongrape (*Berberis nervosa*), serviceberry (*Amelanchier alnifolia*), vine maple, greenleaf manzanita (*Arctostaphylos patula*) (refer to Table 2). Currently ponderosa pine is only representing less than 20% of the overstory component and very little to no shrub component is present in the stands due to high stand densities. Site productivity within the project area range in site indices between 125 to 135 feet on moderate to highly productive sites. They are usually found on moderate slopes with an average elevation between 2,800 to 5,300 feet.

Table 2. Existing Acres by Plant Association within Proposed Project Area

Stand Group	Plant Association	Approximate Acres within proposed project area
A1	Grand fir/vine maple/vanilla leaf	32
A2	Grand fir/queencup beadlily	9
A3	Grand fir/vanilla leaf	4
TOTALS		45

Currently, the project area contains a mix of stands of immature commercial plantations less than 80 years old, sapling age plantations less than 30 years old in moist mix conifer plant communities and recently unmanaged stands (RUS) over 80 years old in both moist and dry mix conifer plant communities. The majority of the plantations, sapling and commercial, are in the stem exclusion stage dominated by small to medium size material with a quadratic mean diameter (QMD) ranging from 3 to 12 inches and an average height of 60 feet in the commercial plantations and 35 in the sapling plantations. The recently unmanaged stands range in age from 90-200 years old and are dominated by stands in the reinitiation stage in both the moist and dry mix conifer plant communities. The QMD within the RUS range from 5-12 inches in the moist mix conifer and 5-14 in the dry mix conifer with an average height range in both of 70-120 feet. Regeneration in the RUS is dominated by shade tolerant species like grand fir and western hemlock and is averaging around 700 trees per acre. Stands have an abundance of ladder fuels built up in the understory with very little to no shrub component.

3.1.2 Effects Analysis

No Action Alternative

Under the No Action alternative, stands would continue to progress through natural successional stages that are already occurring. There would be no forested lands removed. This alternative would have no effect on vegetation resources.

Proposed Action Alternative

Live and dead trees would be cut, in order to facilitate constructing the new pipeline. Removal of trees would vary depending on site and slope to accommodate the new pipe. Tree sizes would typically range in diameter from 5 inches to 26 inches DBH and from 10 feet to 120 feet tall. With less than 50 acres of forested land being treated in the above mentioned plant communities there would be no considerable change in the forest structure for the plant association within the analysis area. During the tree removal process all residual trees would be protected from major damage. Overall, this alternative would have no considerable effect on vegetation resources.

All logging activities would be ground based operations. Existing landing and skid trails would be utilized to move the pipe material when possible. All merchantable (8"-23.9" DBH) trees removed would be staged near open roads for future removal. To meet wildlife habitat requirements, approximately 5% of the largest cut trees (boles only) would be left on site.

Cumulative Effects

For this cumulative effects analysis, all projects shown in the Cumulative Effects Table 1 were considered; however, only projects with effects to vegetation within the project area were analyzed, such as timber and fuels management activities. Since the Proposed Action would result in no measurable change to forested land or plant communities, there would be no cumulative effects for vegetation resources.

3.1.3 Consistency Determination

NFMA Findings for Vegetation Manipulation

As required by regulations (FSH 1909.12 5.31a), "all proposals that involve vegetative manipulation of tree cover for any purpose must comply with the seven requirements found at 36 CFR 219.27(b)." All of these requirements are met by the project (refer to project record).

Suitability for Timber Production

The primary objective of the proposal is fuel reduction rather than timber production. However, as a precursor to the silvicultural diagnosis process, stand examinations are conducted to determine existing stand conditions, and a determination of suitability (in regard to management of the stand for timber production) is made for each stand. Stands proposed for harvest treatment were examined for suitability in accordance with 36 CFR 219.13, Timber resource land suitability. Stands were found to be suitable for timber management based upon the following:

Meet the definition of forestland as described in 36 CFR 219.3.

Technological feasibility exists to ensure soil productivity and watershed protection. All sites considered for treatment would use established harvesting and site preparation methods. In combination with resource protection standards in the Forest Plan and applicable Best Management Practices, these methods would be sufficient to protect soil and water resource values.

There is reasonable assurance that lands could be restocked within 5 years of final harvest (this generally does not apply to the proposed harvest units, as they would be thinned. Small openings in root disease pockets would be regenerated with rot resistant species).

Maximum Harvested Acres (36 CFR 219.12 (k)(5)(iii), 219.27 (d)).

Ensure that no timber harvesting occurs on lands classified as not suited for timber production, except for salvage sales or sales necessary to protect other multiple-use values where the Forest Plan establishes that such actions are appropriate (36 CFR 219.27 (c) (1)). The proposed actions meet the forest plan requirement for less than 40 acres of created openings.

Mt. Hood National Forest Land and Resource Management Plan (Forest Plan)

All of the action alternatives proposed would meet the goals and objectives of the Mt. Hood National Forest Land and Resource Management Plan (Forest Plan) as defined by B-2, Scenic Management Area Direction, B-6, Special Emphasis Watersheds, and C-1, Timber Emphasis as amended, including Standards and Guidelines, Northwest Forest Plan, and Survey and Manage 2001 Record of Decision

Watershed impact areas should not exceed “thresholds of concern (TOC) calculated for each of the special emphasis watersheds. (B6018-020).

Forest Plan guidelines advise that no more than 25% TOC for Upper Dog River be impacted by timber management activities. The proposal is consistent with this standard with less than 1% of the watershed being impacted by the proposed tree removal and piping.

Suitability for even-aged and uneven-aged management

Forest Plan guidelines advise against uneven aged management in stands with dwarf mistletoe and/or root disease. Even-aged management is the effective way to manage dwarf mistletoe and root disease). (Forest wide Standards (FW) 316 and 317), (C1-019-021),(C1-024). Created openings should be no more than 2 acres (FW 323 and 324) and should be focused in areas of stands that are diseased, infested with damaging insect populations, or damaged by storms (C1-022).

The Forest Plan states “However, silvicultural prescriptions may specify appropriate mitigation measures in Management Areas where uneven-aged management is being considered to fulfill resource objectives other than timber production.” (Mt. Hood FP Four-88)(FW 318-347). The resource objective here is fuel reduction while maintaining structure for aesthetics, wildlife, nutrient cycling, and future stand composition and health (FW 148-169). Project design features/mitigation measures such as patch openings, and risk of windthrow are written into the design of the proposed action to meet Forest Plan direction.

3.1.4 Summary of Effects by Alternative

The Proposed Action would result in no considerable direct, indirect, or cumulative effects to vegetation resources. With less than 50 acres of forested land being treated in the above mentioned plant communities there would be no considerable change in the forest structure for the plant association within the analysis area

Additional information regarding this resource can be found in the full specialist report which is incorporated by reference and available in the project record.

3.2 Soil Productivity

3.2.1 Existing Condition

Several field reviews have occurred during the planning lifespan of the project and no soils related issues were discovered.

Currently, there are sufficient levels of effective groundcover across and adjacent to the proposed area of disturbance since no unusual erosion was observed.

Soils across the planning area have been derived from numerous ashfall deposits, primarily from Mt. Hood eruptions. Prevailing winds have a south or west component to them and as the mountain would erupt, ash clouds would be carried downwind and deposited across the entire planning area. Wind, precipitation events, and landslides continue to alter the original depositional pattern by removing ash completely in some places exposing bedrock, and depositing it in others resulting in very thick ash deposits. Soil characteristics are generally similar under the forested terrain across the length of the pipeline footprint.

The soil in the project area is identified as SRI soil map unit 168, with a moderate compaction hazard and surface erosion potential. As explained above, erosion rating of moderate which is based upon *bare* soil (no vegetative or duff cover). The compaction hazard is estimated as moderate, and the susceptibility to soil displacement is high.

3.2.2 Effects Analysis

No Action Alternative

Soil Erosion Risk

The risk of erosion within the analysis area would remain unchanged because the amount of groundcover protecting the soil surface from erosional influences is common and widespread. The expected effect is the landscape would respond and change proportionate to the severity of natural events, such as storms or wildfire.

Detrimental Soil Conditions

It is assumed that soils damaged by previous activities would continue to recover and change at an unknown rate as roots, animals, and other influences slowly break up existing compaction. The effect of soil recovery is a gradual increase in available soil (therefore nutrients and water) for all normally expected soil biological, chemical, and physical functions to occur.

Organic Matter Levels

Soil organic matter and corresponding soil functions would continue without much change. Similar to erosion risk, the expected effect is that the soils at landscape and site scales would respond and change proportionate to the severity of natural events, such as storms or wildfire. In addition, organic matter decomposition is influenced substantially by temperature, moisture, and fire, thus the rate of decay and cycling would continue accordingly.

Proposed Action Alternative

Soil erosion risk

No active erosion from previous management was observed during the field reconnaissance for this project. The project footprint is expected to meet the effective groundcover standard following ground disturbing activities.

Detrimental soil conditions

Soils within the disturbance footprint, and especially the pipeline installation itself, will remain in an intentionally detrimental condition, much like a permanent road. Given the thin, linear nature of the impact, it is not expected to have a measurable effect on the surrounding forest in terms of growth or sustainability.

Organic Matter Levels

Soil organic matter and corresponding soil functions would continue without much change. Similar to erosion risk, the expected effect is that the soils at landscape and site scales would respond and change proportionate to the severity of natural events, such as storms or wildfire. In addition, organic matter decomposition is influenced substantially by temperature, moisture, and fire, thus the rate of decay and cycling would continue accordingly.

Direct and Indirect Effects

Soil Erosion Risk

Soil erosion risk would increase with the Proposed Action because bare soil would be exposed during implementation. As the amount of bare, bare/compacted soil increases, so does the risk of soil movement. Actual resource impairment (erosion and/or sedimentation) is dependent on weather events that provide the energy to move soil material from one location to another. In order to diminish this risk while soils are exposed, certain erosion control techniques are practiced to lessen erosive energies. The effectiveness of these 'Best Management Practices', or BMPs, is discussed by Rashin et.al. (2006) in an applicable publication of the Journal of the American Water Resources Association. Comparing the Proposed Action to their application of studied BMPs would indicate that the proposed project and associated design criteria would substantially reduce the risk of resource damage should a storm event occur while the ground is exposed. For example, the study showed an assessment of surface erosion and sediment routing during the first two years following a timber harvest activity indicated a 10 meter (approximately 30 feet) setback from ground disturbance can be expected to prevent sediment delivery to streams from about 95 percent of harvest related erosion features. Therefore, by maintaining proper amounts of protective groundcover along with BMPs and PDCs, the risk of erosion and subsequent sediment delivery caused by the Proposed Action is extremely small.

Detrimental Soil Conditions

Impacts caused by heavy equipment would increase the amount of detrimental soil damage within the treatment areas, but is not expected to result in a measurable decrease in site productivity.

Organic Matter Levels

Sufficient tonnage is expected to remain on site to provide for organic matter input to the ecosystem once all activities are complete.

Cumulative Effects

Potential cumulative effects projects from cumulative effects in Table 1 have been reviewed and no projects overlap in either time or space within the soils analysis areas, therefore there are no effects to accumulate.

3.2.3 Consistency Determination

The Proposed Action is consistent with all applicable laws, regulations, and Forest Plan guidance.

3.2.4 Summary of Effects by Alternative

The project footprint is expected to meet the effective groundcover standard following ground disturbing activities. Soil erosion risk would increase with the Proposed Action because bare soil would be exposed during implementation. Given the thin, linear nature of the impact, it is not expected to have a measurable effect on the surrounding forest in terms of growth or sustainability. Similar to erosion risk, the expected effect is that the soils at landscape and site scales would respond and change proportionate to the severity of natural events, such as storms or wildfire. Impacts caused by heavy equipment would increase the amount of detrimental soil damage within the treatment areas, but is not expected to result in a measurable decrease in site productivity. Sufficient tonnage is expected to remain on site to provide for organic matter input to the ecosystem once all activities are complete.

Additional information regarding this resource can be found in the full specialist report which is incorporated by reference and available in the project record.

3.3 Hydrology

The hydrologic analysis of water quantity, water quality, and stream channels will focus on the 6th-field hydrologic units including the Dog River and the South Fork Mill Creek. Additionally, the analysis will consider the East Fork Hood River (5th-field hydrologic unit) as it is affected by alterations to the hydrology of the Dog River (a tributary to the East Fork Hood River).

3.3.1 Existing Condition

The affected area for the Dog River Pipeline Replacement Project includes the Dog River and South Fork Mill Creek watersheds on the eastern side of the Cascade Mountains of northern Oregon (Figure 1). Both Dog River and South Fork Mill Creek are low- to mid-elevation streams that eventually drain into the Hood River section of the middle Columbia River. The rivers are fed by a combination of groundwater springs and surface runoff from rain and snowpack. The majority of runoff occurs in spring months and is fed by an average snowpack of ~100 inches at the highest elevations (The Dalles 2017). Additional precipitation in the form of rain occurs in the lower elevations and throughout the watersheds largely in spring and fall months. Given that the watersheds partially sit within the rain-on-snow elevation band of 2,500 to 5,000 feet, spring rain events can cause snowmelt and flashy hydrographs, often resulting in annual peak flows. Base flows are supported by groundwater inputs from tributary springs, which have been documented in Mt. Hood National Forest (MHNH) stream surveys. Snowfall, which accumulates from December through March, melts from April to June; peak flow in stream channels occurs during this spring snowmelt.

Dog River

Dog River is a small river (6th-field hydrologic unit) in Oregon's Cascade Range to the east of Mount Hood and south of the town of Parkdale, Oregon. The Dog River watershed is in the Hood River and Barlow Districts of the MHNH and the river is a tributary of East Fork Hood River (EFHR), draining approximately 8% of the total EFHR watershed. The upper portion of Dog River (36% of the watershed) is within The Dalles Municipal Watershed (Figure 2) and provides a drinking water source for the City of The Dalles. Due to the high value beneficial uses of Dog River (drinking water), it was designated as a Special Emphasis Watershed in the MHNH Land and Resource Management Plan (LRMP; MHNH 1990). Dog River flows north from its headwaters at maximum elevation of 6,480 feet over a distance of 9.8 miles to the confluence with EFHR at an elevation at 2,105 feet. The river channel is steep with an average gradient of 8% (MHNH 2000a).

South Fork Mill Creek

South Fork Mill Creek is a small (6th-field hydrologic unit), low- to mid-elevation (5,050 feet maximum elevation at its headwaters) stream that flows 16.3 miles in a northeastern direction from its headwaters to the confluence with Mill Creek near the City of The Dalles, Oregon. The creek originates in the MHNH but leaves the Forest boundary at an elevation of ~2,600 ft and drains a 27.5 square mile watershed. The watershed is contained within the boundary of the DMW because it provides a source of drinking water for the city. At RM 15.4 (Figure 2), South Fork Mill Creek receives an input from the Dog River Pipeline, which contributes roughly 95% of the total annual flow to the creek (MHNH 1999, 2011). South Fork Mill Creek combines with Crow Creek to form Crow Creek Reservoir at an elevation of ~2,600 ft. Crow Creek Dam was constructed in 1967. The reservoir created by the dam (Crow Creek Reservoir) is a 28-acre impoundment at an elevation of 2,600 feet and has a maximum depth of 65 feet and a storage capacity of 267 million gallons.

The Dalles Municipal Watershed

The DMW is a 34 square mile drainage basin encompassing a portion of the upper Dog River watershed in addition to the majority of the South Fork Mill Creek subwatershed. A 1912 cooperative agreement between the United States Department of Agriculture and the City of The Dalles established the DMW to provide water supply to the city. The cooperative agreement protects the DMW from activities that might compromise the city's water supply. The DMW collects water in the form of rainfall and snowmelt via the Dog River Pipeline and South Fork Mill Creek, which is impounded by Crow Creek Dam that allows for controlled release to the Wicks Water Treatment Plant located eight miles downstream of the dam. Descriptions of each of the Dog River and South Fork Mill Creek watersheds are provided separately.

Stream Network and Channel Condition

Dog River

Dog River is a tributary to EFHR, which combines with Middle Fork and West Fork Hood Rivers before flowing into the middle Columbia River near Hood River, Oregon. Dog River originates as a first-order stream (Strahler 1952) but becomes a third-order stream by the time it reaches EFHR (MHNH 2000a). Dog River drains approximately 12.7 square miles, which represents 8% of the 158-square-mile EFHR watershed.

There are 17.5 miles of perennial stream channel within the subwatershed. The main perennial tributaries to Dog River are Brooks Meadow Creek and Puppy Creek. Brooks Meadow Creek is a small, first-order mountain stream that is largely fed by groundwater springs in Brooks Meadow (Figure 1. Vicinity Map

of Dog River Pipeline Replacement Planning Area (Figure 2). The stream drains a 0.85-square-mile with a mean basin elevation of 4,440 feet. Puppy Creek, which flows into Dog River immediately upstream of the confluence with EFHR, drains 2.2-square-miles with a mean elevation of 3,480 feet.

An August 2000 Stream Survey (MHNH 2000a) documented the conditions and attributes of four different reaches that extend from its headwaters to the confluence with the EFHR. Gradient in the lower reaches are generally steep, averaging nearly 8%, and very confined in a narrow v-shaped valley with steep canyon walls. The upper reaches are relatively shallow, exhibiting a moderate to low gradient channel that flows through a wide, gentle, trough-like gentle valley. Average residual pool depths throughout the drainage were about 1.75 feet during late summer low flows, with the deepest being in the lower reaches. Step-pool sequences dominated the channel type, but not in great numbers. The majority of the hydraulic controls in the stream consisted of substrate (79%), with large woody debris making up only 10% of the total. A 60-foot waterfall is located approximately 2.6 miles upstream of the confluence with EFHR. Data show that the abundance and density of large woody debris in all reaches of Dog River was somewhat low to moderate. There were 23 side channels identified, with an average depth of 0.8 feet, an average length of 97 feet, and an average width of 5 feet.

Data from the survey indicated that small cobbles and coarse gravel are the dominant type of channel substrate, particularly in the lowest reach, and the headwaters reach. Bedrock was present along with fine substrate in the lower middle reach, while coarse gravels dominated the upper middle reach. An average of 11% of the sampled substrate was comprised of fine sediment.

The Dog River watershed is largely forested with conifers. Management and commercial activities such as road development, timber harvest have influenced the condition of the watershed to a moderate degree. Roads are limited primarily to the upper portion of the watershed. There are only two road crossings across the river, one at RM 0.1 where highway 35 crosses over a double box culvert and another at RM 5.5 where FS road 44 where the river flows through a metal corrugated culvert. Road density in the watershed is 2.29 miles per square mile (MHNH 2017a). Twelve percent of the total road miles are paved, while the remaining majority are gravel or native surface.

A small proportion of the upper watershed was logged in the past. These are the younger patches comprised of growing plantations. Approximately 7% of the watershed area consists of these smaller diameter stands, where the canopy closure is less than 70% (MHNH 2017a). One of these older harvest units is located at about RM 1.7, where riparian forest vegetation was encroached upon when it was logged back in the 1980s.

South Fork Mill Creek

South Fork Mill Creek receives tributary inputs from the Dog River Pipeline in the headwater region, in addition to tributaries Crow Creek and Alder Creek (which flows into Crow Creek just upstream of Crow Creek Reservoir) before flowing into Crow Creek Reservoir (Figure 2). There are 26.3 miles of perennial streams in the 27.5 square mile South Fork Mill Creek watershed, resulting in a stream channel density of 0.96 mi/mi². Crow Creek Reservoir sits at an elevation of roughly 2,600 and feeds lower South Fork Mill Creek. South Fork Mill Creek combines with North Fork Mill Creek at an elevation of approximately 770 feet to create Mill Creek, which flows through the City of The Dalles and into the middle Columbia River. Upstream of the confluence with North Fork Mill Creek, water is diverted by Wick's Treatment Plant for drinking water use by the City of The Dalles (Figure 1, Figure 2).

The addition of Dog River flows to the South Fork Mill Creek has affected the nature of the channel downstream. Water that has been diverted from Dog River and routed to South Fork Mill Creek has resulted in increased streamflow within the channel, which has likely increased channel and stream bank scour between the Dog River Diversion and Crow Creek Reservoir and raised the gradient of the channel to approximately 4-6% (MHNH 1999). A 2011 Level II Stream Survey (MHNH 2011) evaluated three reaches of South Fork Mill Creek: Reach 3 from RM 15.94 (headwaters) to RM 15.59, Reach 2 from RM

15.59 to 11.35, and Reach 1 from RM 11.35 to 8.44 (Figure 1, Figure 2). Crow Creek Reservoir lies between Reaches 1 and 2 but was not evaluated in the survey. The highest segment of (Reach 3) the creek is steep and confined. Controlled releases downstream of the Crow Creek Dam have caused alterations to the stream channel in the lower reaches of the stream. The dam-regulated channel in Reach 1 averages 4% gradient and a greater width-to-depth ratio (13.3) than the channel upstream of the reservoir. Additional channel modification took place until the 1980s where log jams and in-stream wood was removed as a common practice to prevent it from potential transport downstream. The stream survey found that the majority of woody debris in the system is small and the density of LWD in all reaches was below LRMP or NMFS standards for woody debris density. In comparison, a 2000 stream survey of North Fork Mill Creek also observed woody debris density to be below LRMP standards, although density was above the NMFS standard in one of two reaches. The 1999 and 2011 stream surveys noted low pool frequency, particularly of primary pools which was well below LRMP standards in all reaches.

Substrate data from the 2011 Level II Stream Survey showed that very coarse gravel (32–64 mm) was the dominant substrate size in Reach 1 (19%), likely due to lack of fine sediment released by the dam. In Reach 2, sand (<2 mm) accounted for 23%, with coarse gravel (16–32 mm) and small cobble (64–128 mm) each accounting for 17% of the total pebble count. In Reach 3 medium gravel accounted for 40% of the total pebble count with coarse gravel (16–32 mm) accounting for 31%.

Management and commercial activities such as road development and timber harvest for fuels reduction have influenced the forested cover of the watershed over the years. South Fork Mill Creek is part of The Dalles Municipal Watershed and is a Special Emphasis Watershed in the MHNFLand and Resource Management Plan and therefore certain management actions have been taken to safeguard the supply of domestic water to the City of The Dalles. It is closed to public entry except for walk-ins during the fall hunting season. Roads are closed except to all but administrative use, and there are few crossings that intersect the drainage network. Recent thinning as a form of fuels reduction to decrease the likelihood of catastrophic wildfires over the last two decades has occurred across more than 30 percent of Forest Service lands in the watershed.

In 2013 the Government Flats wildfire burned across about one-third of the Municipal Watershed. About 100 acres were on Forest Service lands in the watershed, the remainder were on private, county, or city lands. Approximately 7% of the combined North and South Fork Mill Creek Watershed is made up of younger managed stands with less than 70% cover and an average DBH of less than 8 inches (MHNFL 2017a), meaning that despite past timber harvest and wildfire the majority of the forested canopy still functions to intercept rainfall and perform evapotranspiration processes at the watershed-scale.

Water Quantity and Streamflow

Dog River

The hydrology of Dog River is driven by spring (groundwater) contributions during baseflow periods, and snowmelt (non-glacial) during high flow periods, with the majority of runoff taking place in the spring and early summer (May to June). Peak runoff events are often driven by rain and rain-on-snow events (MHNFL 1996) with annual peak flows occurring in the fall, winter, and spring-summer of any given year (20–100 cfs at approximately RM 5; MHNFL 2017b). Hydrological data availability for Dog River is limited. Records exist from a historic USGS stream gage near the pipeline diversion from 1960–1971 and some very limited flow data is available from both the City of The Dalles at the pipeline diversion location and from the Confederated Tribes of the Warm Springs Reservation of Oregon (CTWS) just upstream of the confluence with the EFHR.

Average monthly streamflow at the Pipeline diversion ranges from 2.5 cfs in the fall (October) to 18 cfs in the spring (June). Estimated D95 flows (flows that are exceeded 95% of the time, i.e., summer low

flows) for Dog River above the confluence with East Fork Hood River are 8.5 cfs, 0.3 cfs for Puppy Creek (3.5% contribution), 6.5 cfs for Dog River above the Pipeline intake and 0.8 cfs for Brooks Meadow Creek (~12% contribution [USGS 2017]). D5 flows (flows that are exceeded only 5% of the time, i.e., peak spring runoff flows) for the drainage are estimated to be 96.1 cfs for Dog River at the confluence with EFHR, 17.8 cfs for Puppy Creek (~19% contribution), 35.9 cfs for Dog River above the Pipeline diversion and 4.2 cfs for Brooks Meadow Creek (~24% contribution; Table 5). A maximum recorded flow of 100 cfs was measured at the USGS gage near the pipeline diversion on May 29, 1969.

A portion of Dog River flow is diverted for municipal use by the City of The Dalles at an elevation of approximately 4,300 feet (at approximately RM 6, just downstream of the former USGS stream gage location), which decreases the actual D95 flows downstream of the diversion. Average stream and diversion flow data from the City of The Dalles are presented in both Table 3 and Table 4. Historically, the entire flow of the river has been diverted by The Dalles from June through October (approximately 3–10 cfs; Table 6); however, only a portion of flows from November to May (approximately 30%–70%) are diverted. Flow diversions from the spring to fall of 2016 ranged from 2.7 cfs in late September to 10.2 cfs in late May 2016, whereas Dog River flows ranged from 2.4 cfs in late September to 21 cfs in early May 2016.

In cases when the pipeline is full in the winter and spring, roughly 1.9 cfs are thought to leak from the pipeline. Sufficient flow to fill the pipeline is generally available in May and June, although the pipeline may only fill to capacity for roughly 1 week per year. Efforts to determine the flow path of the leakage have been indeterminate (MHNH 2017c). Small leaks have been observed at several sites along the pipeline, but the location of the majority of the loss is unknown. Although the entire flow of the river is diverted in the summer, surface flows are replaced by groundwater shortly downstream of the diversion.

Flow monitoring in 2016 and 2017 by CTWS indicated that flows within Dog River may at times be lower than the Oregon Water Resources Department (OWRD) instream water right recommendations for Coho salmon, summer steelhead, winter steelhead, rainbow trout, and cutthroat trout (OWRD 1999). However, flow measurements are only available for one year of data collection and did not account fully for a side channel that may transport roughly 3 cfs of Dog River low flows (CTWS 2017). The flows documented by CTWS provide an indication of the reduction of flow diverted by The Dalles and the loss of flow in the side channel at the monitoring location. While the D95 estimate from USGS StreamStats is 8.5 cfs, the CTWS data measured winter flows of less than 5 cfs. This discrepancy may be partially explained by measurement error associated with the location of CTWS measurements and the diversion of flows out of the channel by the Dog River Pipeline.

Human activities within the Dog River watershed that have the potential to influence the hydrology of the river include the presence of roads, past timber harvest, and recreational trails. Due to the low mileage of roads and connectivity with the stream network, and low amount of acres of past timber harvest (~7% of watershed area) these activities are not likely to have had a noticeable effect on the hydrology of the Dog River. There are several trail segments located within the riparian corridor of the river, but they are small and mostly disconnected from the stream too, so they have a negligible effect as well.

Table 3. Monthly Average Flow for Dog River and the Dog River Pipeline

	May	June	July	August	September	October
Dog River	15.7	7.7	4.4	3.3	2.7	3.6
Dog River Diversion	8.1	7.6	4.9	3.5	3.0	3.6

	May	June	July	August	September	October
Percent of Dog River diverted	52%	99%	109%	108%	112%	99%

Note: Values for percent of Dog River diverted that exceed 100% are because of measurement variation. From June to October 2016, the entire flow of Dog River was diverted into the Dog River Diversion (MHNH 2017b).

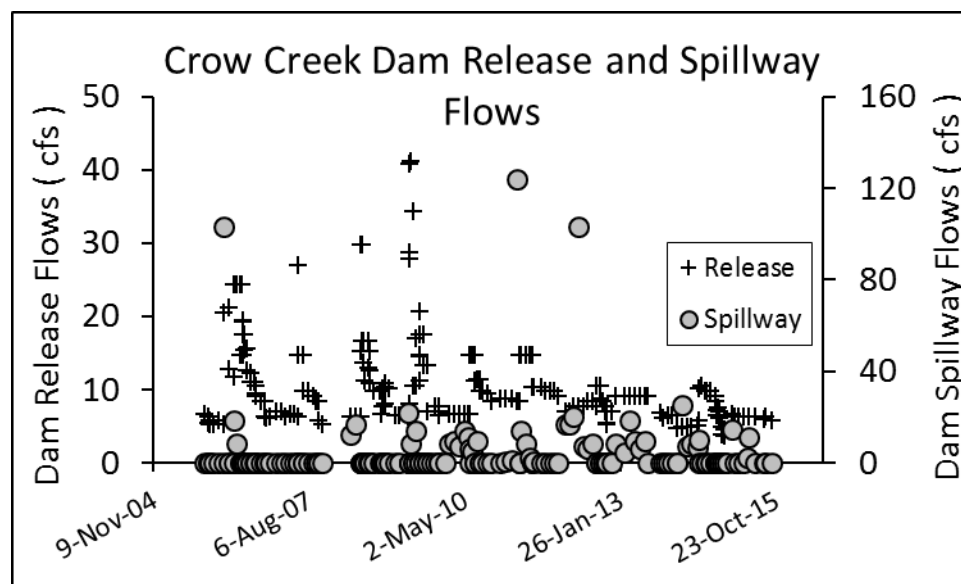
South Fork Mill Creek

Very little flow data are available for South Fork Mill Creek. Dam release and spillway flows are available from the City of The Dalles for 2005 to 2015 (Figure 4). Low flow statistics for South Fork Mill Creek, Crow Creek, and Alder Creek were generated with the USGS Stream Stats software); USGS 2017). South Fork Mill Creek has an estimated flow of 0.85 cfs more than 95% of the time, and Crow Creek has an estimated flow of 0.28 cfs 95% of the time, which indicates that Crow Creek would naturally contribute roughly one third of the base flow. The Dog River Diversion commonly transfers an average of 3 cfs to South Fork Mill Creek in the late summer the flow that is present more than 95% of the time, and up to approximately 10 cfs during high flow events in the winter and spring.

Flow release data from Crow Creek Dam demonstrate the large contribution of Dog River flows; dam releases are commonly 6 cfs or higher (Figure 4) and releases that are 6 cfs or higher would only naturally be generated by South Fork Mill Creek roughly 50% of the time (USGS 2017). A minimum of 2 cfs must be released from the dam during summer months as a stipulation in the Special Use Permit to provide aquatic habitat. The high flows in South Fork Mill Creek of 135 cfs which is exceeded only 5% of the time, is released out of the spillway likely occur during large rain events in the spring or rain-on-snow events in the winter and early spring. Roughly 20% of the drainage area is within the rain-on-snow elevation band (2,500 to 5,000 feet).

Other human activities within the South Fork Mill creek watershed that have the potential to influence the hydrology of the stream include the presence of roads, past timber harvest, and recreational trails. Due to the low mileage of roads and connectivity with the stream network, and low amount of acres of past timber harvest (~13% of watershed area on Forest Service lands) these activities are not likely to have had a noticeable effect on the hydrology of the Dog River. Trails located within the watershed are not located in a riparian corridor, nor intersect a stream, so they have a negligible effect as well.

Figure 4. Crow Creek Dam Release and Spillway Flows



Water Quality

Dog River

Dog River, situated in the Hood Basin, is designated by the Oregon Department of Environmental Quality (ODEQ) with numerous beneficial use designations, including public domestic water supply, private domestic water supply, industrial water supply, irrigation, livestock watering, fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation, aesthetic quality, hydropower and commercial navigation and transportation. Dog River up to roughly RM 5 and the rest of the East Fork Hood River are designated for salmon and steelhead spawning use from October 15 to May 15.

Minimal water quality information is available for Dog River. The river is listed as impaired for iron by the Oregon Department of Environmental Quality (DEQ) on the 303(d) list of impaired waters in the 2012 Integrated Report. Temperature data collected by the MHNf above the Dog River Diversion indicates that temperatures within Dog River are cold and vary seasonally from close to 0°C in the winter (December to February) to approximately 13°C in late July (MHNf 1996, 2016). Temperature monitoring from July through October 2000 as part of a USFS stream survey (MHNf 2000a) found that the 7-day maximum temperature remained below 13°C, which met the NMFS and ODEQ water quality standards for salmon and steelhead. A June 2017 technical memorandum from the CTWS described Dog River as potential cold-water thermal refuge for salmon species because of the groundwater inputs from springs and wet meadows (CTWS 2017).

Temperature monitoring was conducted in Puppy Creek near its mouth during a 2001 MHNH stream survey. The seven-day maximum average temperature did not exceed 14.5°C and was within ODEQ standards (MHNH 2001). Long-term water temperature data have not been recorded in Brooks Meadow Creek, but given the short stream length (approximately 1 RM), moderate flow (approximately 2 cfs during late summer), very high hyporheic zone activity throughout the entire length of the stream, high primary shade zone present (60 feet out from edge of stream channel), and high elevation (approximately 4,500 feet), it is likely that water temperature there is not elevated (MHNH 2016).

Road development is minimal in the Dog River watershed, and the majority of logged areas within the watershed are in various stages of regrowth, thus the potential for water quality impacts from either is low. No DEQ 303(d) impaired listings exist for Dog River for turbidity, sedimentation or temperature.

South Fork Mill Creek

South Fork Mill Creek is designated with numerous beneficial use, including public domestic water supply, private domestic water supply, industrial water supply, irrigation, livestock watering, fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation, aesthetic quality and hydro power. South Fork Mill Creek is not listed as impaired on the Oregon Department of Environmental Quality's 303(d) list for any of the beneficial uses.

South Fork Mill Creek downstream of The Dalles Municipal Diversion, along with North Fork Mill Creek and Mill Creek, is designated for salmon and steelhead spawning use from October 15 to May 15. A Hobo temperature monitor was installed in South Fork Mill Creek, at the USFS boundary, from July 9, 1999 to November 3, 1999, by the MHNH (MHNH 1999). Seven-day average minimum and maximum water temperatures for South Fork Mill Creek above Crow Creek reservoir did not exceed 13°C and were in compliance with NMFS water quality standards (Figure 5). Additionally, the MHNH monitored summer stream temperatures just downstream of Crow Creek Reservoir from 2009 to 2012 (Figure 6). Seven-day maximum temperatures appeared to commonly increase above the 13°C standard from early august to early October.

Figure 5. Seven-day-minimum and maximum temperatures in South Fork Mill Creek.

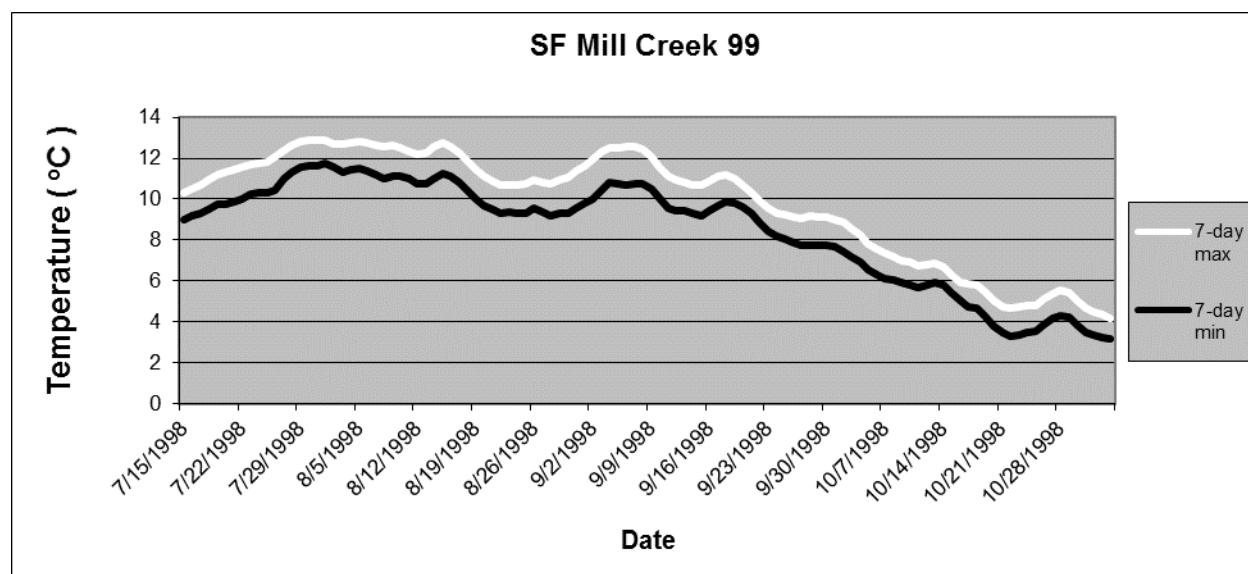
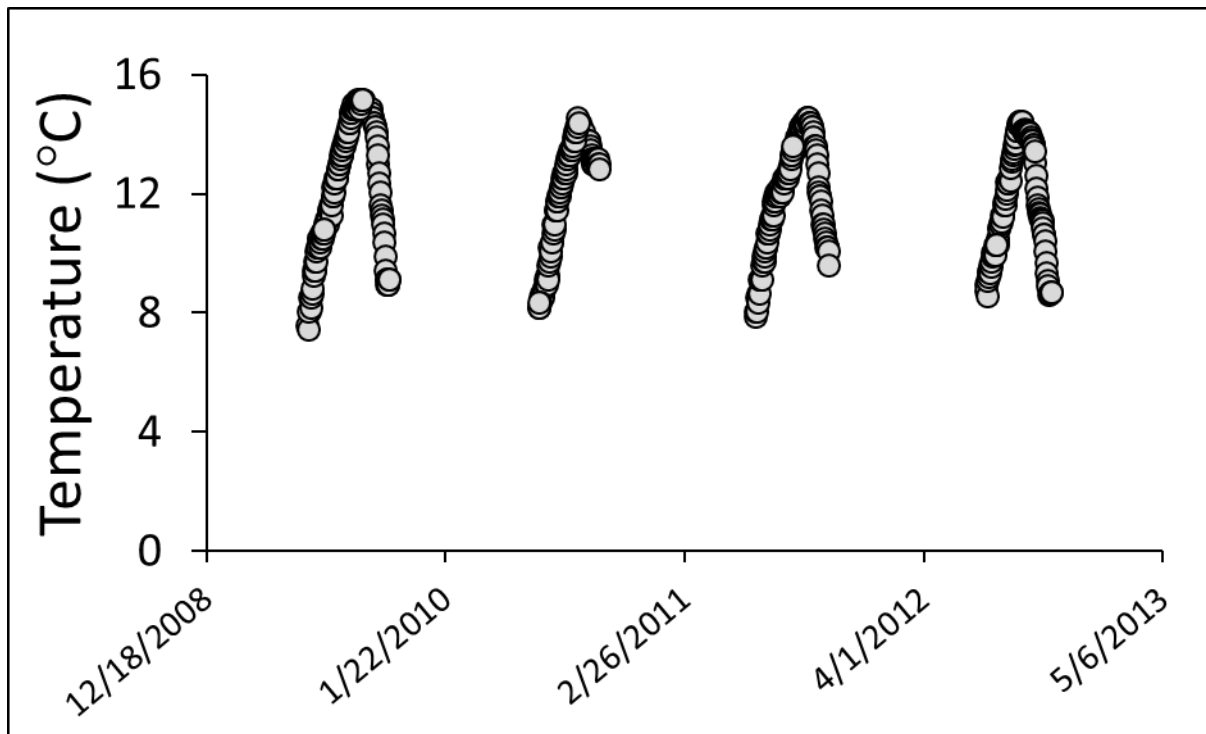


Figure 6. Summer average daily temperature for South Fork Mill Creek (MHNF 2017b).



The City of The Dalles performs regular water quality testing on the South Fork Mill Creek just upstream of its municipal water treatment plant. Other than seasonal or storm variation in temperature, turbidity, pH and hardness, the water quality is found to be high, with the exception of high coliform concentrations because of occasional wildlife fecal contamination. Historically, South Fork Mill Creek has had slightly elevated phosphorus concentrations, but the input of low-phosphorus Dog River water has helped maintain low concentrations of phosphorus within the South Fork Mill Creek (MHNF 2000b). Until 1984 copper sulfate was used to treat algal blooms in Crow Creek reservoir; which likely had temporary adverse impacts to downstream aquatic life (MHNF 2000b).

The presence of roads within the watershed in addition to past logging (thinning) activities and recent forest fires have the potential to influence water quality within the creek. Road density and connectivity however is minimal, and most of the recent timber harvest has been in the form of thinning to reduce fuels and the potential for uncharacteristic wildfire. But, there are no DEQ 303(d) listings for South Fork Mill Creek for turbidity, sedimentation or temperature.

3.3.2 Effects Analysis

No Action Alternative

The No Action Alternative represents the continued operation of the existing Dog River Pipeline.

Water Quantity

Dog River

Under the No Action Alternative, the quantity of water in Dog River and its tributaries would remain unchanged from current conditions. Under existing pipeline operation, a 40 to 100 percent of the flow in would be diverted, depending on the time of year (Mount Hood National Forest [MHNF] 2017b). Table 4 exhibits the average monthly amount of flow diverted into the pipeline in a typical year. The No Action Alternative affects the quantity of the river within all reaches downstream of the diversion throughout the year.

The magnitude of the effects would be greatest during the late summer and early fall when flows are lowest. During low-flow periods, 100 percent of Dog River is often diverted into the pipeline. While this de-waters the river in the reach immediately downstream of the diversion, hyporheic flow and perennial tributaries (such as Brooks Meadow Creek) that flow into the stream shortly below the diversion help to recover surface flow within the reach. Additionally, there are many seeps and springs that contribute flow to the river throughout its length (MHNF 2000a). Water diverted during the late fall and early winter months would lessen the magnitude of peak flows in Dog River that can occur, by as much as 70 percent at the diversion.

The diversion of water from Dog River can result in flows that are lower than the Oregon Water Resources Department (OWRD) junior instream water right recommendations for Coho salmon, summer steelhead, winter steelhead, rainbow trout, and cutthroat trout (Confederated Tribes of Warm Springs [CTWS] 2017; OWRD 1999) in the lowest reach of Dog River.

Table 4. Estimated Mean Monthly Percent of Dog River Flow Diverted into the Dog River Pipeline under the No Action and Proposed Action Alternatives

Month	No Action Alternative	Proposed Action Alternative (shading indicates change from No Action)
January	81%	81%
February	55%	55%
March	79%	79%
April	61%	61%
May	44%	44%
June	40%	40%
July	59%	59%
August	81%	81%
September	97%	83%
October	100%	80%
November	85%	85%
December	100%	100%

The maximum capacity of the existing pipeline is about 12.3 cubic feet per second (cfs). The amount of flow available to fill the pipeline however, occurs only about 2 percent of the time. Usually, there is not enough flow in Dog River to fill the existing pipeline to capacity. Peak flow periods in the late fall and early winter are used to fill Crow Creek Reservoir. When the reservoir is filled to capacity, diverted flows are decreased to match the live flow needs of the City's water treatment plant (approximately 3.1 cfs

during the winter) thereby allowing greater flows to be bypassed down Dog River. Diverted flows are rarely halted completely as water cannot be allowed to freeze at the diversion structure or within the wooden pipeline. Diversion is typically resumed when the reservoir is tapped in late spring and summer.

The existing pipeline is known to leak, although only some of the locations have been located. If the pipeline is filled to capacity, it is estimated that about 1.9 cfs could leak before outfall into SF Mill Creek. Efforts to trace the fate of the leaks have not been conclusive (MHNH 2017c). A dye test that was conducted indicated that leakage from the pipeline into Dog River or Brooks Meadow Creek could not be detected over a 6-hour period. It is believed that the leakage likely infiltrates slowly into the ground around and below the pipeline in both the Dog River and SF Mill Creek watersheds. Deep soils in which the pipeline is buried have moderate to low runoff potential. Leakage probably infiltrates throughout the soil profile and returns slowly to groundwater.

South Fork Mill Creek

Under continued operation of the Dog River Pipeline, water quantity in all reaches of SF Mill Creek would remain unchanged. Therefore, the quantity of water within SF Mill Creek would continue to be artificially inflated above natural conditions, particularly in Reach 2 between the pipeline and Crow Creek Reservoir (Figure 1, Figure 2Figure 1). This increase in base- and peak flows has the potential to increase water velocities, water depth, and to result in the modification of the stream channel.

Based on U.S. Geological Survey (USGS) Stream Stats estimates (USGS 2017), the average input of 5.2 cfs to Reach 2 from the pipeline could be roughly five times that of the D50 flow (6.66 cfs; streamflow that is exceeded 50% of the time at the confluence with NF Mill Creek). This indicates that pipeline inputs may commonly be greater than the flow within SF Mill Creek (the D50 in Reach 2 near the pipeline is lower than the D50 downstream at the confluence with NF Mill Creek) and would increase the creek's base- and peak flow noticeably.

When the pipeline is filled to capacity during peak runoff, roughly 10.4 cfs (12.3 cfs minus 1.9 lost to leakage) is estimated to be delivered to SF Mill Creek, which represents roughly 8% of the estimated D5 flow at the confluence with NF Mill Creek (135; flow that is exceeded 5% of the time) (USGS 2017). In Reach 1 (downstream of Crow Creek Reservoir), the flows can be managed actively at the reservoir outlet and are managed to mimic a natural flow regime per The Dalles Reservoir Special Use Permit (USFS 1967). A minimum of 2 cfs would continue to be released year-round to sustain aquatic life and for aesthetic purposes.

Water Quality

Dog River

Under the No Action Alternative, the water quality of Dog River and its tributaries would remain unchanged from current conditions. While the river is listed as "impaired" for iron, it appears to meet all other water quality numeric criteria associated with its designated beneficial uses and habitat (temperature) requirements of listed fish species that may be present. The complete diversion of Dog River flows into the pipeline during summer months would deplete the reach immediately downstream of the diversion. Low flow and warm air temperatures can increase water temperatures and decrease dissolved oxygen concentrations in the river, potentially degrading water quality conditions. However, there are no water quality data available to verify if these effects have occurred in this reach, and there are no impairment listings by Oregon Department of Environmental Quality (ODEQ) (except for iron). The input of water from groundwater sources and hyporheic flow helps to maintain surface water flows in the lower segments of this reach of Dog River in addition to those downstream. Data from the lowest reach (MHNH 2017b) near the mouth of Dog River indicate that water temperatures remain cold year-round,

rarely exceed water quality standards for temperature, and meet the ODEQ requirements of the fish and aquatic life beneficial uses (Figure 6; ODEQ 2017b).

Given the age and current condition of the existing pipeline, there is a possible risk of catastrophic pipeline failure that could result in heavy, short-lived impacts to water quality within Dog River and/or its tributaries, particularly if it were to occur on a steep slope. If the pipeline were to fail in proximity to the Dog River channel or in proximity to the headwaters of Puppy Creek, sediment inputs could degrade water quality in those streams as long as the pipeline continues to flow. Repairs to the pipeline could take days to weeks; however, the diversion could be shut off quickly (within <1 day) to prevent further impacts to water quality.

No removal of vegetation would take place and no ground disturbance would occur under the No Action Alternative, therefore stream shade that influences water temperatures would not be impacted and no new sources of sediments to Dog River would be expected.

Under the No Action Alternative periodic impacts to water quality within Brooks Meadow Creek would continue to occur when maintenance vehicles access the maintenance road where it crosses the ford through the stream channel. The magnitude of these impacts would depend on the frequency with which vehicles would pass through the creek. Given that the access road travels through the stream bed, each time a vehicle would cross the stream there would be a localized increase in turbidity and suspended sediment, which would be short-lived.

South Fork Mill Creek

Under continued operation of the Dog River Pipeline, water quality in all reaches of SF Mill Creek would remain unchanged. The creek is not currently listed as impaired for any water quality parameters in accordance with its designated beneficial uses and its current condition reflects the operation of the existing pipeline. SF Mill Creek historically had slightly elevated phosphorus concentrations, but the input of low-phosphorus Dog River water has actually helped maintain low concentrations of phosphorus within the SF Mill Creek (MHNF 2000b). The delivery of Dog River flow into SF Mill Creek may result in increased water velocities and turbulence. This could have the potential to cause an increase in turbidity, but this has not been documented and there is no evidence of incision or bank erosion (MHNF 2017b). Condition 27 of The Dalles Reservoir permit prohibits sudden surges from the dam that could result in channel changes or erosion (USFS 1967), which helps to protect water quality in the reach immediately downstream of Crow Creek Dam.

Temperature data for the SF Mill Creek at the 2,500 foot elevation site (Figure 6; MHNF 2017b) and water quality monitoring by The Dalles just upstream of its treatment plant indicate good water quality. Water quality within the stream appears to consistently meet numeric criteria associated with its beneficial and the No Action Alternative would not result in any changes to this condition.

Given the age and current condition of the existing pipeline, there is a possible risk of catastrophic pipeline failure that could result in heavy, short-lived impacts to water quality within SF Mill Creek, particularly if it were to occur on a steep slope. If the pipeline were to fail in proximity to SF Mill Creek, sediment inputs could degrade water quality in those reaches as long as the pipeline continued to flow. Repairs to the pipeline could take days to weeks; however, the diversion could be shut off quickly (within <1 day) to prevent further impacts to water quality.

No removal of vegetation would take place and no ground disturbance would occur, therefore water temperatures would not be impacted, and no new sources of sediments would contribute inputs to SF Mill Creek.

Stream Channel

Dog River

The No Action Alternative would have low potential to cause impacts to the Dog River stream channel downstream of the diversion. With the continued operation of the existing Dog River pipeline, roughly 40–100 percent of the river’s flow (based on average monthly flow at the diversion point) (**Table 4**) would be diverted from the river channel throughout the year, thus decreasing both baseflow and peak flows within the river. This altered hydrograph could affect the reach immediately downstream of the diversion because peak flows important for channel maintenance and the redistribution of sediments and large woody debris would be lessened. Additionally, a reduction in overall flow could reduce pool depths, width-to-depth ratios, and the wetted perimeter. Inputs from hyporheic and tributary flows however, would help to augment stream flows further downstream to maintain suitable water depths. Additionally, the stream channel downstream of the diversion is largely unaffected by human modification, so the deep pools and large wood noted by the 2000 stream survey (in Reaches 1 and 2) would be maintained.

Under the No Action Alternative existing impacts to the stream channel of Brooks Meadow Creek could be expected to continue. The pipeline maintenance access road will continue to pass through the Brooks Meadow Creek stream channel, so that segment of the reach would remain disturbed. This has been the alignment of the access road for many years. Future impacts to the channel caused by the use and location of the access road would not be different than what has already taken place. The area of impact is very small (~2% of total stream length).

South Fork Mill Creek

Effects of the No Action Alternative on the SF Mill Creek stream channel are expected to be low. Under the continued operation of the existing pipeline, a portion of Dog River’s flow would be diverted into SF Mill Creek throughout the year, thus increasing base- and peak flows in the creek. A modified hydrograph can result in impacts to a stream channel (for example bank erosion, incising, and channelization). This would be most likely to occur in the reach between the pipeline and Crow Creek Reservoir (Reach 2). These effects would likely be low, given that the No Action Alternative would not represent any change in the current (and historic) operation of the pipeline and flow inputs to the stream. Additionally, there is no evidence of incision or bank erosion, indicating that the channel is able to accommodate the increased flows (MHNH 2017b). Reach 1 (downstream of Crow Creek Reservoir) would not likely experience impacts to the condition of the stream channel due to dam management guidelines that limit the timing and magnitude of releases to protect aquatic habitat (Condition 27 in USFS 1967).

Proposed Action Alternative

The Proposed Action Alternative involves replacing the Dog River pipeline with a new, larger (24-inch-diameter) pipeline. The new pipeline would have the potential to divert more water during high flow events and would be sealed, thus reversing the leakage of Dog River flows from the existing pipeline. Under the Proposed Action Alternative, a minimum instream flow of 0.5 cfs would be left in Dog River in September and October. Additionally, a fish screen would be installed at the pipeline diversion and an Aquatic Organism Passage (AOP) type crossing would be installed to pass Brooks Meadow Creek under the pipeline service road (1700-014).

Water Quantity

Dog River

The replacement of the Dog River pipeline under the Proposed Action Alternative would have low potential for short- and long-term impacts to water quantity within the Dog River watershed. A portion of

the river's flow would be diverted by the pipeline throughout the year, thus reducing water quantity; although the severity of impacts would vary seasonally and would only change from the existing condition during September and October (Table 4). Due to the inclusion of a Project Design Criterion (PDC; PDC 10-1) that would require a minimum in-stream flow of 0.5 cfs to be left in the river from during September and October, the flow in Dog River during these months would increase (compared to the No Action Alternative), thus reducing the magnitude of water quantity effects. The majority, however, of the Dog River flow (~80%–83%) would still be diverted from the channel during these low-flow months (Table 4). The new pipeline would be able to transport all of the water that is diverted from Dog River because there would not be any leakage.

The greatest potential for impacts to water quantity would continue to be within the reach of the river (Figure 1Figure 2) immediately downstream of the intake. Inputs from hyporheic flow however, and perennial tributaries (such as Brooks Meadow Creek) that enter into the river shortly downstream of the diversion would help to recover its surface flow.

During high flow periods (winter and spring) the new pipeline would be able to divert additional water. This expanded capacity would allow The Dalles to fill Crow Creek Reservoir faster by diverting a greater proportion of peak flows when they are available. Once the Reservoir is filled, the amount of diverted flow would be decreased. Pipeline diversions during high-flow periods would decrease the magnitude of peak flows in the river, as up to 26.3 cfs (73% of the estimated D5 flow of 35.9 cfs) (USGS 2017) could be diverted. The diversion capacity of the replacement pipeline would be greater than the average monthly flow in May (15.6 cfs) and June (18.2 cfs) in Dog River just upstream of the diversion (MHN 2017b), and thus the pipeline could only be filled during peak runoff events.

USGS streamflow records from 1960–1971 indicate that Dog River flows at the site of the diversion may reach 26.3 cfs or greater in 2 of every 3 years; however, the duration of those peak flows may be minimal. The potential to divert the entirety of spring runoff flows into the pipeline would generally be constrained by flow availability (peak flows may only last a matter of hours or days) and Crow Creek Reservoir storage capacity. It is expected that the diversion schedule under the Proposed Action Alternative would be similar, although the larger replacement pipeline would be filled to capacity less frequently, due to the larger capacity of the replacement pipeline.

Activities associated with the construction of the project have low potential to cause effect water quantity in Brooks Meadow Creek. The ford road crossing through it would be replaced by a new culvert capable of providing passage of aquatic organisms. This reach would be temporarily dewatered to facilitate construction of the new culvert. The water would be diverted through a temporary pipe and redirected back into Brooks Meadow Creek further downstream while the culvert is being installed.

South Fork Mill Creek

Under the Proposed Action Alternative, the potential for effects to the quantity of water in SF Mill Creek would be low. There would be no leakage with a new replacement pipeline, and it would have the potential to transport more water during high flows due to the larger 24-inch diameter, delivering more water to the upper reaches of SF Mill Creek, and filling Crow Creek reservoir more rapidly. The amount of water diverted during peak flows could increase notably because the new pipeline's capacity would more than double (from 12.3 to 26.3 cfs). Although spring flows sufficient to fill the pipeline to capacity are very infrequent. But during times when there would be available flow, it is estimated that at least 20 percent more of the D5 flow could be captured.

During September and October 0.5 cfs of bypass flow would be made available to Dog River. Less water would be delivered to SF Mill Creek and therefore flows would be slightly lower in Reach 2. There would be an estimated 12 percent decrease in flow in Reach 2 of SF Mill Creek during September and October.

Water Quality

Dog River

Under the Proposed Action Alternative, the potential for effects to water quality in Dog River would be low. There are no impairment listings by ODEQ for either temperature or low concentrations of dissolved oxygen for Dog River. Data from Reach 1 (Figure 5, Figure 6; MHN 2017b) indicate that water temperatures remain cold year-round, rarely exceed water quality standards for temperature, and meet the criteria of ODEQ for the listed beneficial uses. The Proposed Action would continue to divert Dog River flows on a similar schedule to the No Action Alternative (Table 4); however, the addition of PDC 10-1 to provide 0.5 cfs bypass flow during September and October would alleviate the potential for water quality degradation late in the season. Baseflow would be maintained during the low-flow periods September and October, benefiting and maintaining cold stream temperatures and dissolved oxygen.

The diversion of flow throughout the rest of the year (November–August) would be similar to the existing flow schedule (Table 4), except for the potential for the diversion of a larger portion of peak flows. The potential for increased diversions above the No Action Alternative would be constrained by the magnitude of available peak flows and available Crow Creek Reservoir storage capacity. Also, the timing of peak flow (May–June) reduces the potential for water quality impacts, as air temperatures are generally cool during winter and spring months.

The narrow footprint of the new pipeline construction, minimizing the disturbance footprint in the riparian zone, and the PDCs to minimize erosion and sedimentation, indicate that the potential for construction-related impacts to water quality would be low and temporary. Construction of the new pipeline would result in the removal of trees and the excavation of a 4-foot-deep and 3- to 4-foot-wide trench adjacent to the existing pipeline. Additionally, the installation of a new pipeline intake and fish screen would occur. There could be a short-term increase in sedimentation and turbidity expected at the intake structure, and potentially the first 1,000 feet of new ditch closest to the reach just below the intake. The timing of project construction (May–October) would avoid the rainy season, helping to mitigate the potential for sediment and runoff from excavation and heavy equipment activity closest to the river.

A new culvert would be installed underneath the pipeline service road (1700-014) where it crosses through Brooks Meadow Creek. This reach would be dewatered and diverted back to the channel downstream, minimizing the potential for temporary increases in sedimentation and turbidity during installation. Following an initial inundation period, the water quality of Brooks Meadow Creek would improve; and sedimentation from the use of the old road ford would no longer occur.

South Fork Mill Creek

The potential for effects to water quality in SF Mill Creek under the Proposed Action would be low. Water deliveries from Dog River would be similar to current deliveries, except for minor changes during fall low-flow periods and potentially during winter/spring high-flow periods. These changes to water deliveries would be unlikely to impact the water quality of SF Mill Creek. The creek is not listed as impaired for any water quality parameters in accordance with its designated beneficial uses (ODEQ 2017b) and water chemistry parameters (measured at Wick's Treatment Plant) consistently represent good water quality. SF Mill Creek historically had slightly elevated phosphorus concentrations, but the input of low-phosphorus Dog River water associated with the Proposed Action would help to manage phosphorus concentrations at lower concentrations.

Water deliveries during September and October would be 0.5 cfs lower and maximum capacity of the pipeline would more than double from 12.6 cfs to 26.3 cfs. An increase in high flows as a result of a larger pipeline could be expected, although the occurrence would be low because that amount of available flow is not frequent. Elevated high flows have the potential to impact water quality by causing an increase

in suspended sediments and turbidity due to bank erosion and channel scour. The effect would be temporary and similar to naturally occurring high flow events from heavy precipitation or snowmelt.

Pipeline operations would manage diverted flows so that the erosive effects to SF Mill Creek from high magnitude surges of water would be minimized. The frequency of elevated spring water deliveries would be limited by the availability of runoff of sufficient magnitude, and Crow Creek Reservoir storage capacity limitations.

Construction of the new pipeline will result in the removal of trees and the excavation of a 4-foot-deep and 3- to 4-foot-wide trench. These activities have the potential to contribute loose sediment to SF Mill Creek and its tributaries. However, given the narrow footprint of the new pipeline construction, the forest buffer surrounding the SF Mill Creek corridor, the avoidance of the riparian reserve adjacent to the creek, and the PDCs in place to minimize erosion and impacts to water quality, there is low potential for construction-related impacts to water quality.

Stream Channel

Dog River

Under the Proposed Action the potential for effects to the Dog River stream channel would be low. Effects would stem from alteration of the natural hydrograph from replacement pipeline operation and diversion of peak flows to fill the pipeline to capacity. The reduction in peak flows would not function to redistribute substrate and subsequent re-working of the channel configuration, potentially reducing pool depth, LWD density, and habitat heterogeneity (Poff et al. 1997). However, diversions associated with the Proposed Action would be similar to the existing pipeline operation (except from September 1 to October 31; see Table 4), and therefore would not represent a significant change from existing conditions. Additionally, increased diversion of spring flows beyond the capacity of the existing pipeline would happen very infrequently due to the lack of sufficient spring flows and Crow Creek Reservoir storage capacity limitations.

South Fork Mill Creek

Elevated flows diverted into SF Mill Creek from Dog River have the potential to alter the stream channel. If the pipeline under the Proposed Action Alternative were filled to capacity during periods of high flow in SF Mill Creek, the combined flow from the pipeline and the SF Mill Creek watershed would likely result in effects to the stream channel in Reach 2 of SF Mill Creek. However, pipeline operations would manage diverted flows so that the erosive effects to SF Mill Creek from high magnitude surges of water would be minimized. Additionally, PDC 1-11 specifies that Dog River flow shall not be added to SF Mill Creek during high-flow events exceeding 200 cfs, which would minimize the potential for additional impacts to the stream channel during peak runoff in the SF Mill watershed. Given how infrequently the existing pipeline is filled to capacity (up to 2% of the time), the replacement pipeline would only be expected to be filled during less than 2% of the year.

Cumulative Effects

The spatial extent of the Hydrologic Resources Cumulative Effects Analysis is limited to the Dog River and SF Mill Creek watershed areas. While it may seem logical to include East Fork Hood River and Mill Creek watersheds given that the watersheds of focus are tributaries to these larger systems, it would not be feasible to consider all of the potentially connected actions within the extended watershed area. The temporal boundary for the analysis stems from the present to the foreseeable future when projects associated with existing decisions, funding, or identified proposals will be undertaken. The projects to be considered in cumulative effects are listed below in Table 1. Table 8 summarizes the cumulative effects of ongoing activities that have the potential to effect water quantity and/or quality in Dog River and/or SF Mill Creek.

The cumulative effects of the Proposed Action and ongoing/future activities within the Dog River and SF Mill Creek watersheds on water quantity, water quality, and stream channels would be minimal. Given that they are Special Emphasis Watersheds (as designated in the MHNFRMP), no more than 25% of the watershed area can be in a hydrologically disturbed condition at any time. The Special Emphasis designation and LRMP guidelines would help to control the extent of potential impacts from ongoing or future activities within the watersheds. Additionally, none of the activities listed in Table 2 would cause major impacts to the hydrologic condition of the watersheds, presuming that all LRMP guidelines are followed in all activities.

Dog River

Specifically, no timber harvests are planned within the Dog River watershed, all road decommissioning/closures have already taken place, and none of the developed and dispersed campsites are located within the watershed area. Maintenance and sanding of Highway 35 likely delivers sediment into the lowest reach of Dog River, so the amount expected to result from the pipeline replacement would be negligible in comparison. It is not anticipated that the cumulative effects of the Proposed Action and the activities listed in Table 2 would be significant to water quantity, water quality, or stream channel in the Dog River watershed.

South Fork Mill Creek

None of the activities listed in Table 2 would cause major impacts to the water quantity, water quality, or stream channel of the SF Mill Creek watershed, presuming that all LRMP guidelines are followed in all activities. While there are ongoing timber harvests in addition to planned future timber harvests, the Special Emphasis protection in addition to LRMP guidelines would help to minimize impacts (for example increases in peak flow and sedimentation) associated with the harvests.

Table 5. A summary of cumulative effects on water quantity and quality.

Project	Potential Effects	Cumulative Effect?	Extent, Detectable?	Hydrology or Water Quality Effect
Existing Old Forest Service Timber Harvest Units	Reduction in Baseflow	Possible	Projects completed. Harvest units are recovering and although many trees are not mature, they take up groundwater and lose it through evapotranspiration. Harvesting did not take place in the Dog River watershed.	Minimal cumulative effect throughout action area because the harvest took place so long ago and reforestation has occurred.
	Water Quality Degradation	Possible	Projects completed. Although most previous timber harvest occurred decades ago riparian stands were treated more aggressively in many areas than current practices and thus the amount of standing wood remaining was less than there would be without these harvests. Regrowth has occurred in areas that were harvested and therefore the potential for runoff to transport sediments from the soil surface has decreased.	Minimal cumulative effect due to relatively little thinning in Riparian Reserves and the re-growth that has occurred.
Pollalie Cooper Fuels Reduction Project	Reduction in Baseflow	Possible	The Pollalie Cooper Decision was recently signed and is considered an ongoing project. It was modified to remove vegetation treatment within the Crystal Springs contributing area. Activities include thinning, including within Riparian Reserves (custom no-cut buffers adjacent to stream with a width dependent upon stream type).	Minimal cumulative effect due to relatively little thinning in Riparian Reserves proposed in the action area. In some streams, localized thinning could influence the water cycle and sedimentation associated with runoff.
	Water Quality Degradation	Possible		
Timber Harvests on Federal, County And Private Lands (including associated road/landing construction)	Reduction in Baseflow	Possible	Timber harvests have taken place in the SF Mill Creek watershed, but not in Dog River. These harvests are likely detectable, although they do not effect more than 7% of the watershed area.	Minimal cumulative effect throughout action area because of the small proportion of the watershed that has been affected. Regrowth in harvested areas may reduce baseflows locally.
	Degradation of Water Quality	Possible	Timber harvests have taken place in the SF Mill Creek watershed, but not in Dog River. These harvests are likely detectable, although they do not effect more than 7% of the watershed area.	Minimal cumulative effect throughout action area because of the small proportion of the watershed that has been affected. Regrowth since the harvest likely stabilizes the soils and reduces the potential for sedimentation with runoff.

Project	Potential Effects	Cumulative Effect?	Extent, Detectable?	Hydrology or Water Quality Effect
Surveyors Ridge Trail Relocation	Reduction in Baseflow Degradation of Water Quality	No	An ongoing analysis of the Surveyors Ridge trail relocation is being completed as a CE, proposing to remove sections of the trail prior to implementation and after construction is completed. Surveyors Ridge Trail (No. 688) follows the existing pipeline for approximately 2.7 miles. Approximately 4 miles of trail would be relocated east of the pipeline in three sections in order to maintain trail connectivity and reduce conflict between motorized and non-motorized users. One section would connect the existing Super Connector Trail to the Surveyors Ridge Trail just past the junction with the pipeline. The second section running parallel to the pipeline would be relocated approximately parallel with the pipeline to the east. The relocation would connect to existing trails and maintain through-travel both during and after implementation. There would be minimal cumulative effects to water quality within the project area.	There is potential for increased cumulative effect on water quality if loose sediments associated with construction of the new train result in increased sedimentation to Dog River.
Past Aquatic Restoration Projects (road decommissioning, East Fork Hood River stream channel projects)	Reduction in Baseflow Degradation of Water Quality	No No	Projects are completed. No change in water quantity is expected. Projects are completed. No change in water quality is expected.	None None
Dog River Trail Relocation CE	Reduction in Baseflow Degradation of Water Quality	No No	There will likely be an overlap in timing of this project with the Dog River Pipeline Project; however, there are no activities planned that would decrease streamflow, nor would any activities increase fine sediment that could affect water quality in Dog River.	None
Ongoing Road Maintenance, Including Snowplowing on Both National Forest land and Highway 35	Reduction in Baseflow Degradation of Water Quality	No	It is expected that all road maintenance needs on National Forest land would be taken care of with the Dog River Pipeline Project. Road maintenance activities off National Forest land cannot be determined as specific road maintenance projects have yet to be identified. Known recurring road operations off National Forest land that may have a potential for cumulative effects would be sanding on Highway 35 during the winter. The timing of sanding has the potential to provide sediment that may mix with road maintenance activities in the Dog River Pipeline Project but no measurable cumulative effect is expected due to the small amount of potential sediment from the pipeline replacement.	There would be no effect to water quantity or water quality.

Project	Potential Effects	Cumulative Effect?	Extent, Detectable?	Hydrology or Water Quality Effect
Noxious Weed Treatment	Reduction in Baseflow Degradation of Water Quality	No	These activities are ongoing in the NF and SF Mill Creek. These actions were approved under a CE.	There would be no impacts to water quantity and minimal impacts to water quality.
Road Decommissioning and Closures	Reduction in Baseflow Degradation of Water Quality	No	Road decommissioning within Dog River and SF Mill Creek has been completed.	None
Developed and Dispersed Campsites	Reduction in Baseflow Degradation of Water Quality	No	There are no developed campsites in the Dog River or SF Mill Creek subwatersheds. There will likely be an overlap in timing of this use with the Dog River Pipeline Project; however, there should not be any impact to water quantity or quality in Dog River or SF Mill Creek.	None

3.3.3 Consistency Determination

The Dog River Pipeline Project is consistent with all applicable hydrology-related federal laws, plans, and guidelines as outlined below.

Law, Regulation & Policy

Existing plans provide guidance for projects in the form of Standards and Guidelines and recommended Best Management Practices (BMP). These documents include the Mount Hood National Forest Plan and the Northwest Forest Plan (NWFP). There is significant overlap between aquatics and hydrology/water quality in terms of applicable standards and guidelines; therefore, those listed below are directly related to fisheries, management indicator species, or other aquatic special status species. See the Hydrology Specialist Report for other pertinent standards and guidelines.

Forest Plan Standards and Guidelines (pages Four-53 through Four-63):

- Water: FW-054 through FW-079
- Riparian Area FW-080 through FW-136

Northwest Forest Plan Standards and Guidelines:

The NWFP outlines an aquatic conservation strategy (p. B-9) and specifies aquatic conservation strategy objectives (p. B-11) and components of the aquatic conservation strategy (p. B-12).

Desired Future Condition

The desired future condition (DFC) for streams and associated riparian areas within the Dog River Pipeline Project Area is summarized in several sources as outlined below:

The NWFP Aquatic Conservation Strategy (ACS) was developed "...to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands." Within this strategy are nine ACS objectives that give direction regarding the maintenance and/or restoration of aquatic processes key to watershed health. These objectives can be considered DFCs from an aquatic perspective for the project area.

Finally, the Forest Plan presents DFCs for all management areas, including General Riparian Areas. The list of DFCs can be found on page Four-254 in the LMRP, and the General Riparian Area management goal is to:

"Achieve and maintain riparian and aquatic habitat conditions for the sustained, long-term production of fish, selected wildlife and plant species, and high-quality water for the full spectrum of the Forest's riparian and aquatic areas. A secondary goal is to maintain a healthy forest condition through a variety of timber management practices."

3.3.4 Summary of Effects by Alternative

No action Alternative

Under the No Action Alternative, water would continue to be diverted from Dog River and transported to SF Mill Creek year-round. This would continue to decrease both baseflow and peak flows in Dog River compared to the natural flow regime and increase flows in SF Mill Creek when compared to the natural hydrograph. During summer low flows, the entire flow of Dog River would be diverted into the pipeline. During peak flows, 12.3 cfs could be diverted to fill the pipeline, and approximately 1.9 cfs would continue to be lost into the ground adjacent to the pipeline in both Dog River and SF Mill Creek watersheds, potentially contributing to groundwater. Given that current operation of the existing pipeline has not resulted in any impacts to water quality within Dog River or SF Mill Creek, no impacts are expected to occur under the No Action Alternative. However, diversion of the entire Dog River flow during late summer months has the potential to cause warming of stream temperatures, reduction in dissolved oxygen concentrations and an overall reduction in flow in the reach immediately below the diversion. The potential for failure of the aging pipeline also poses a risk of temporary sediment inputs to Dog River and/or SF Mill Creek. Continued alteration of the Dog River and SF Mill Creek stream channels is possible due to the continued alteration of the natural flow regime within each watershed, but there has not been any notable evidence observed up to this point in time.

Proposed Action Alternative

The Proposed Action Alternative would divert flows from Dog River into SF Mill Creek year-round through a larger (24-inch-diameter) pipeline. Additionally, a new intake structure with a fish screen would be installed, and an AOP (culvert) would be installed under pipeline service road 1700-014 for Brooks Meadow Creek.

The new pipeline would improve the efficiency of water transfer from Dog River to SF Mill Creek, preventing water loss, and enhancing inflow to Crow Creek Reservoir. The expanded capacity of the replacement pipeline would allow for increased diversions during high flows, which have the potential to reduce peak flows in Dog River and increase them in SF Mill Creek. Available flow from Dog River though, would usually be too low for the pipeline to convey more water than what is currently diverted. Essentially, it would serve only to increase the pace that the reservoir is filled, Bypass flow of 0.5 cfs

during September and October would help maintain water quality and augment base flow late in the season.

Ground disturbance and tree removal associated with the construction of the project has the potential to cause short-term impacts to water quality of Dog River and SF Mill Creek. Implementation of PDCs however, would minimize increased sedimentation and turbidity. The Proposed Action is not expected to have long-term effects on the water quality of Dog River or SF Mill Creek and they are expected to continue to meet numeric water quality criteria associated with their defined beneficial uses.

The increased capacity of the replacement pipeline would have the potential to affect the condition of the stream channel in both Dog River and SF Mill Creek. By modifying the natural hydrograph and diverting a greater proportion of peak flows, additional alteration of the stream channels has a low potential to occur. Inherent available streamflow in Dog River however, is typically relatively low and effects are expected to be minimal because peak flows capable of filling the new pipeline would occur infrequently and for only a short period of time.

Additional information regarding this resource can be found in the full specialist report which is incorporated by reference and available in the project record.

3.4 Fisheries and Aquatic Fauna

3.4.1 Existing Condition

General Information

The action area for the Dog River Pipeline Replacement Project includes the Dog River subwatershed and the South Fork Mill Creek drainage on the eastern side of the Cascade Mountains of northern Oregon. Elevation in the action area ranges from around 2,100 to 4,500 feet. The majority of runoff occurs in spring months and is fed by an average snowpack of ~100 inches at the highest elevations (The Dalles, 2017). Additional precipitation in the form of rain occurs in the lower elevations and throughout the watersheds largely in spring and fall months. Given that the watersheds partially sit within the rain-on-snow elevation band of 2,500 to 5,000 feet, spring rain events can cause snowmelt and flashy hydrographs. Snowfall, which accumulates from December through March, melts from April to June; peak flow in stream channels occurs during this spring snowmelt.

Dog River

The hydrology of Dog River is driven by spring (groundwater) contributions during baseflow periods, and by the addition of snowmelt during high flow periods, with the majority of runoff taking place in the spring and early summer (May to June). The main perennial tributaries to Dog River are Brooks Meadow Creek and Puppy Creek. Approximately 8 percent of the Dog River subwatershed is contained within the larger 5th field hydrologic unit of the East Fork Hood River. Other than the lower ¼ mile, the river channel is steep with an average gradient of 7% and 11% in the 2 reaches surveyed between RM 0-5.1 (MHNf, 2000a). Base flows are supported by numerous groundwater/spring inputs. The uppermost critical habitat designation ends at RM 2.0, but for this BA LFH is delineated to RM 2.6 at a 60' waterfall. It is possible that in some years, small numbers of steelhead may be able to make it up to the falls. The subwatershed is largely forested with subalpine fir and pacific silver fir in upper elevations and transitioning to a drier forest made up of grand fir, Douglas-fir, and ponderosa pine at lower elevations (MHNf 1996).

South Fork Mill Creek

In contrast to Dog River, South Fork Mill Creek has a relatively gentle gradient that averaged 3% and 6% in the 2 reaches within the action area (MHNf, 2011). Since 1887, South Fork Mill Creek has received input

from the Dog River ditch/pipeline, in addition to natural tributary contributions from Crow Creek and Alder Creek, before flowing into Crow Creek Reservoir. Dog River pipeline contributes roughly 95% of the total annual flow to the creek (MHNH 2011). The USFS Stream survey in 2011 did not note any other contributions, such as springs. At RM 11.1, the Crow Creek Reservoir is a 28-acre impoundment at an elevation of 2,600 feet and has a maximum depth of 65 feet and a storage capacity of 267 million gallons. There are no LFH within the action area due to Mill Creek falls located at RM 3.0. The drainage is largely forested with Western hemlock, grand fir, Douglas-fir, and ponderosa pine.

Pipeline Operations

The City of The Dalles has an 1870 state-issued water right for all of the water in the stream at the point of the Dog River diversion. During the dry months of the year (approximately June through October) the City diverts 100 percent of Dog River flow into the Dog River transmission pipe (RM 6.0). In the fall and early winter, as Dog River flows increase, available flows are diverted up to the capacity of the pipe (12.3 cfs) to refill Crow Creek Reservoir. Once the reservoir is full, diverted flows are reduced to around 3 cfs for the remainder of winter and early spring. Historically, the entire flow of the river has been diverted by The Dalles from June through October (approximately 3–10 cfs); however, only a portion of flows from November to May (approximately 30%–70%) are diverted. Flow diversions from the spring to fall of 2016 ranged from around 2.7 cfs in late September to 10.2 cfs in late May 2016, whereas Dog River flows ranged from 2.4 cfs in late September to 21 cfs in early May 2016. Although the entire flow of the river is diverted in the summer, surface flows are replaced by groundwater immediately downstream of the diversion. A USFS stream survey from July 26 – August 30 of 2000 noted wetted stream channel in all areas downstream of the diversion. The discharge rate of 8.3 cfs was recorded at the mouth on July 26, 2000.

Land Ownership/Allocation

Most of the Action Area of Dog River and SF Mill Creek is within the MHNH boundary, with the exception of portions surrounding Crow Creek Reservoir, as well as the lower 1.4 miles of Dog River. Mt. Hood Meadows has ownership from RM 0-0.7 (mouth to Hwy 35 crossing), while Hood River County has ownership from RM 0.7 to 1.4. The USFS MHNH boundary starts at Dog River RM 1.4. On USFS lands, NWFP land Use Allocation for the action area is a mixture of Late Successional Reserve, Matrix, and Riparian Reserve. The upper portion of Dog River (36% of the subwatershed) and all of the SF Mill drainage is designated as The Dalles Watershed Management Unit, and provides a drinking water source for the City of The Dalles. Due to the high value beneficial uses of Dog River (drinking water), it was designated as a Special Emphasis Watershed in the MHNH Land and Resource Management Plan (LRMP; MHNH 2017a).

Historical Management

The action area largely has intact forested areas. In the lower elevation, highway and other road infrastructure has chronic impacts to fish habitat due to floodplain constriction. Timber harvest and recreation activities have, and will continue, to occur. Since 1887, Dog River stream flow has been ditched or piped into the South Fork Mill Creek channel for use as municipal water.

Environmental Baseline Conditions

This section provides a description of the environmental baseline for the Dog River subwatershed and South Fork Mill Creek drainage. Table 6 provides a summary of current habitat and watershed conditions. These conditions are compared to the biological requirements of the listed species from the AP table entitled: FWS/NOAA Fisheries Table of Population and Habitat Indicators for Use in the Northwest Forest Plan Area. Data collected from stream surveys, water quality monitoring, queries of GIS databases, and watershed analyses were compared to the default AP values resulting in a determination of the current condition category of Properly Functioning, Functioning at Risk, or Not Properly Functioning. This analysis was conducted for the entire action area and all streams with LFH in the action area have been surveyed for aquatic habitat

conditions. Although the surveys vary in age, all are after 1996, which was the last major flood event to dramatically change stream habitat conditions. Two ESA listed species and three ESA listed species' Critical Habitat are assessed below: Coho salmon and steelhead and their designated critical habitat, as well as LCR Chinook Critical Habitat.

Table 6. Summary of environmental baseline conditions in the Dog River Pipeline Replacement Project action area.

Indicator	Properly Functioning	Functioning at Risk	Not Properly Functioning
Temperature	X		
Suspended Sediment- DO/Turbidity		X	
Chemicals/Nutrients	X		
Physical Barriers		X	
Substrate Embeddedness		X	
Large Woody Material			X
Pool Frequency and Quality			X
Large Pools			X
Off-channel Habitat		X	
Refugia		X	
Width to Depth Ratio		X	
Streambank Condition	X		
Floodplain Connectivity		X	
Change in Peak/Base Flows		X	
Drainage Network Increase		X	
East Fork Hood River 5th Field HUC			
Road Density & Location		X	
Disturbance History		X	
Riparian Reserves		X	
Disturbance Regime		X	

Stream Temperature

From 1994-2002, temperature data was collected by the MHNH Hood River Ranger District at RM 0.07 (Highway 35 culvert). The CTWS has additional data for 2016 and 2017. In addition, temperature monitoring from July 7 to October 19, 2000 was conducted as part of a USFS stream survey (MHNH 2000a) that noted the 7-day maximum temperature remained below 13°Celsius. Thirty-three tributaries were recorded for Dog River during the July 26-August 30, 2000 stream survey, with temperatures that ranged from 3-11° C. Dog River flow stays cold year-round due to numerous cold-water springs. A June 2017 technical memorandum from the CTWS described Dog River as potential cold-water thermal refuge and rearing habitat for protected salmon

species because of its cold, clear water (CTWS 2017). A Hobo temperature monitor was installed in South Fork Mill Creek, at the USFS boundary (just upstream of Crow Creek Reservoir), from July 9, 1999 to November 3, 1999, by the MHNH (USFS 1999). Seven-day average minimum and maximum water temperatures for South Fork Mill Creek did not exceed 13°C. Additionally, the MHNH monitored summer stream temperatures just downstream of Crow Creek Reservoir (outside of the action area) from 2009 to 2012. Seven-day maximum temperatures appeared to commonly increase above the 13°C standard from early August to early October.

Baseline Condition: Data indicates that water temperatures remain cold year-round, and almost always meets the 13°C requirements of listed fish species based on the ODEQ criteria. This indicator is **properly functioning** for Dog River and south Fork Mill Creek.

Suspended Sediment – Intergravel DO/Turbidity and Substrate Character

Fine sediment levels in Dog River are low. Substrate data from the 2000 USFS stream survey showed that small cobbles and coarse gravel are dominant in Dog River. Substrate data from the 2011 USFS stream survey in South Fork Mill Creek recorded sand (<2 mm) accounted for 11-23%. Observations by FS personnel noted moderate silt levels that caused some gravel embeddedness. Coarse gravel (16-32 mm) accounted for 16-31% of the substrate. In the upper most reach, medium gravel (4-16 mm) accounted for 51% of the substrate.

Baseline Condition: Small cobbles and coarse gravel are dominant in Dog River and gravel is dominant in South Fork Mill Creek. Both stream have low levels of turbidity although surface fines are slightly high (>20%) in SF Mill Creek. Based on this information, this indicator is **functioning at risk** for SF Mill Creek, and **properly functioning** for Dog River.

Chemical Contamination/Nutrients

There are very low potential sources for chemical contamination in the Dog River and South Fork Mill Creek watersheds. Most of the upper action area is closed to entry within the The Dalles Watershed Management Area. The rest of the area is largely commercial forest land, which also has seasonal recreation use. There is no agricultural or industrial land in the action area. Oregon Highway 35 is the only (paved) road that crosses LFH. This road is well-designed to route road surface contaminants onto well-vegetated areas.

Baseline Condition: Since there is no indication of chemical contamination in the action area, this indicator is **properly functioning**.

Physical Barriers

Although there are numerous natural barriers (steep gradient and waterfalls), there are no known human caused barrier to ESA listed fish in the action area.

Baseline Condition: Since there are no known anthropogenic barrier to listed fish migration, this indicator is **properly functioning** for the action area.

Large Woody Debris

Action area streams are very close to meeting AP standard for >20 pieces per mile. Recruitment potential along nearly the entire length of Dog River is considered to be good to excellent. Most of its length flows through lands administered by the Forest Service. The riparian corridor and upland slopes are heavily forested. Disturbance within the subwatershed has been very minimal, and there is an abundance of stream-adjacent large standing conifers. The upper reach of Dog River above the pipeline intake is within the designated The Dalles Watershed Management Unit, which is a protected area with limited access. Along the lower reaches of Dog River below the intake, which are outside of the watershed management area, access is also somewhat limited. There have been; however, several stands where timber had been harvested roughly

thirty years ago. The lower margins of these two older harvest units partially encroached upon the riparian zone, though a buffer was left untouched to protect the river and its banks. This condition applies to about 4 percent of the total length of the riparian corridor. The remaining 96 percent of the corridor has been unaffected by any large-scale disturbance, and the recruitment potential for large wood is high. In the South Fork Mill Creek subwatershed, large wood recruitment along riparian corridors is also good. These stream reaches are all within The Dalles Watershed Management Unit and located on lands administered by the Forest Service downstream to Crow Creek Reservoir. There has been timber harvest in the form of thinning and fuel reduction projects adjacent to portions of the riparian corridor within the subwatershed. Intact riparian buffers however, have not been treated and there remains an abundant source of stream-adjacent large conifers available for potential recruitment. None of the large wood can move outside the action area into downstream LFH due to the complete barrier at Crow Creek Reservoir (and dam).

Baseline Condition: Action area streams are very close to meeting AP standard for >20 pieces per mile and the vast majority of riparian stands are intact. Adequate sources are available for both long term and short term recruitment. The baseline condition for large wood recruitment potential is considered **properly functioning**.

Pool Frequency and Quality/Large Pools

Pool frequency in all stream reaches within the action area is below AP standards. This is less about intact riparian habitat being able to provide adequate pool-forming wood, and is rather more indicative of these small streams being transport reaches or are located in naturally riffle dominated canyons. Other than the lower ¼ mile, the Dog River channel is steep with an average gradient of 7% and 11% in the 2 reaches surveyed between RM 0-5.1 (MHN, 2000a). South Fork Mill Creek gradient averaged 3% and 6% in the 2 reaches within the action area (MHN, 2011). Pool quality is a descriptive measure of their suitability for fish and other aquatic fauna. Pools of higher quality are deeper and contain some form of cover for fish (i.e. large wood, undercover bank, water turbulence bubbles). Pools in the action area generally have adequate cover, temperature regime, and have not been impacted by fine sediment deposition. Adequate sources of large wood are available for both long term and short term recruitment.

Baseline Condition: Pool frequency is below AP properly functioning values in almost every stream reach surveyed. This is very likely a natural condition due to gradient and narrow valley form. Pool quality is good, with cold temperatures, generally good cover, and little impact from pool sedimentation. This indicator rates out as **functioning at risk**.

Off Channel Habitat and Floodplain Connectivity

Off channel habitat is infrequent because of the steepness of the streams in the action area. Few side channels are present in Dog River and SF Mill Creek, and they tend to be high energy habitats; there are few off-channel features such as oxbows or backwaters. Most this is a natural condition due to the confined valley form and steep gradients of Dog River and moderately confined valley for SF Mill Creek, with the exception of the area at Oregon Highway 35. The highway, at RM 0.7 constricts Dog River through a 60' double box culvert and reduces floodplain connectivity and off-channel habitat through this low gradient (1%) reach.

Baseline Condition: Given that off-channel habitats are largely limited naturally but a major highway constricts floodplain functions and off-channel habitat potential in LFH, this criterion is determined to be **functioning at risk**.

Refugia

Limited refugia are present within the action area for adult and juvenile spring Chinook salmon, Coho salmon, and winter steelhead. Most of this is a natural condition due to steep gradients of Dog River, with the exception of Highway 35. The highway, at RM 0.7 constricts Dog River through a 60' double box culvert and reduces complexity and refugia habitat through this low gradient (1%) reach. Intact riparian reserves,

conservation areas, ground water upwelling areas, and seeps are present and protected in the action area. Cold water year-round provide a temperature refugia for anadromous fish in Dog River, although access is naturally limited due to steep gradients and waterfalls. On SF Mill, a waterfall downstream of the action area prevents any passage of anadromous species into the action area.

Baseline Condition: Although refugia exists in Dog River, it is limited due to both natural conditions (steep gradient), as well as from a highway crossing at a low gradient area near the mouth of Dog River. This indicator rates out as **functioning at risk** in the action area.

Increase in Drainage Network and Road Density

There is some increase in drainage network due to roads (and associated ditchlines) within the action area. Road density is relatively low in the action area; with around 2.3 miles per square mile in Dog River, and 2.2 in SF Mill Creek (MHN 2016, MHN 2000b). Much of the action is within The Dalles Watershed Management Area, thus additional road building or other disturbance will be minimized. A small percentage of total road miles are in valley bottoms.

Baseline Condition: Road density is between 2-3 miles/square mile in the action area. There is some increase in drainage network from existing roads. These indicators are **functioning at risk** for the action area.

Disturbance History

The vast majority of the action area is forested, with portions managed as commercial timberland, while others are protected as riparian reserve or the in the The Dalles Watershed Management Area. As discussed previously in the peak/base flow baseline section, much less than 15% of the watershed is Equivalent Clearcut Area (ECA). Very little disturbance from vegetation management is within riparian areas, but the existing municipal water diversion pipeline has been in operation within the stream and riparian area since 1887. Oregon highway 35, at RM 0.7, constricts Dog River through a 60' double box culvert through one of the few low gradient (1%) reach accessible to anadromous fish (LFH).

Baseline Condition: Although there is <15% ECA for the watersheds, there is human disturbance in stream and in riparian area of the action area, thus this indicator rates as **functioning at risk**.

Riparian Reserves

Oregon highway 35 does bisect LFH on Dog River at RM 0.7 and thus removes this section (highway right-of-way) as functional riparian area. On USFS lands, Riparian Reserves within the action area provide adequate shade, large wood recruitment, and connectivity. The existing pipeline access road (4400-011 mainly) is within riparian reserves, but only about 815' are within 100' of Dog River. Since inception of the NWFP in 1994, fish-bearing perennial stream are mandated to have adequate riparian buffers to protect stream and riparian values. The last planning effort, Polallie Cooper hazardous fuel reduction in 2016, prescribed a minimum 100' no-treatment buffer for Dog River. SF Mill Creek is within the Special Emphasis The Dalles Watershed Management Unit which does not allow any created openings in Riparian Reserve.

Baseline Condition: Most Riparian Reserves within the action area is in good to excellent condition, but due to the presence of 815' of the pipeline access road within Riparian Reserve as well as Oregon highway 35 crossing at LFH, this indicator rates as **functioning at risk**.

Disturbance Regime

Natural processes, such as scour events, glacial debris torrents (Dog River mouth from East Fork HR), and wildfire, continue to occur in the action area as a regular part of environmental disturbance. Impairment of natural disturbance regimes due to human cause changes and management is moderate in scope and in scale. A

major highway crosses the mouths of an LFH streams (Dog River) in the action area, which alters hydrology, sediment, and large wood routing which, in turn, has altered natural processes.

Upstream of the highway crossing (RM 0.7), there is sufficient habitat resiliency in the watershed to recover from most disturbance events and natural processes are generally stable. Natural disturbance events, regardless of type, are localized in discrete areas. The watershed has fertile soil, enough rainfall, and abundant surface and groundwater to quickly begin, and then maintain, the recovery process.

Baseline Condition: Localized human infrastructure in LFH has created conditions in the watershed that are considered **functioning at risk**.

Environmental Baseline Condition - Critical Habitat PBFs

Critical Habitat has been designated for LCR Columbia River steelhead trout, LCR Chinook and LCR Coho salmon. Within the action area, this designation includes the lower 2.0 miles of Dog River. The freshwater Physical and Biological Features (PBF) for Lower Columbia River steelhead trout, Chinook salmon, and Coho salmon critical habitat include spawning, rearing, and migration habitats that have been addressed in the habitat indicators and status of listed species/critical habitat previously, with the exception of forage for anadromous juvenile freshwater life stage (addressed below). The proposed action will have no effects on PBFs for estuarine, nearshore, and offshore marine areas, as these habitats are >150 miles downstream of the action area.

Freshwater rearing sites with forage supporting juvenile development

Diverse and intact streamside vegetation provide sufficient allochthonous sources of coarse organic matter to support a diverse forage base (macroinvertebrates) in streams within much of the action area. Natural cover such as large wood, log jams, aquatic vegetation, large boulders, side channels, and undercut banks are available but are less common as compared to conditions historically since Oregon Highway 35 crosses Dog River LFH just upstream of its mouth (RM 0.07). This is the lowest gradient section of Dog River, at about 1%, as compared to 7-11% from RM 0.2 upward. CTWS and USFS snorkel surveys have detected the presence of juvenile salmonids during the summer and may indicate that a limited stretch of Dog River provides clear and cold water rearing habitat for juvenile salmonids. East Fork Hood River is a glacial system, and runs very turbid during summer and early fall months. Freshwater rearing habitat quantity and diversity were determined to be key limiting factors for anadromous production (Coccoli, 2004). Due to partial disruption from the existing highway infrastructure, this PBF is considered to be functioning at risk.

Presence and Status of ESA Listed Fish Species/Critical Habitat, Sensitive Aquatic Species and Survey-Manage Species

Listed fish habitat (LFH) for LCR steelhead (*Oncorhynchus mykiss*), LCR Chinook salmon (*O. tshawytscha*), and LCR coho salmon (*O. kisutch*) is present in the action area (Figures A-1, A-2, and A-3 in Appendix A). Sensitive Aquatic Species present include inland rainbow trout (*O. mykiss gairdneri*), Pacific lamprey (*E. tridentatus*), resident cutthroat trout (*O. clarki*) and Dalles juga (*J. hemphilli dallesensis*). Fish distribution was based on the most current information available which is a combination of the 2000 USFS stream survey, anecdotal surveys conducted by agency personnel and professional judgment. Additional information exists regarding anadromous adult returns and smolt outmigration through 2009 when Powerdale Dam was removed. Actual upper limits of distribution for some species/runs relied on agency observations and professional judgment.

Winter Steelhead

Lower Columbia River Distinct Population Segment (DPS) steelhead trout were listed as threatened on March 19, 1998 and their threatened status was reaffirmed on January 5, 2006. NOAA Fisheries issued results of a five-year review on August 15, 2011 and concluded that this species should remain listed as threatened. A final critical habitat designation was published on September 2, 2005, with an effective date of January 2, 2006. The DPS includes all naturally spawned anadromous steelhead populations below natural and manmade impassable barriers in the Hood River and tributaries. The artificial propagation program in the Hood River is one of ten such programs included in the DPS. Summer steelhead distribution and designated critical habitat in the action area.

Both LCR summer and winter steelhead runs are present in the Hood River Basin; however, only winter steelhead are present in the EFHR. Steelhead are found in the EFHR and the lower reaches of Dog River (Rod French, ODFW, personal communication, 2017) including the action area. Adult winter steelhead typically enter the Hood River in early December to mid-June before spawning from mid-January to late June. Most juvenile steelhead emigrate as age-2 or age-3 smolts and spend 2 years rearing in the ocean before returning as adults. Winter steelhead runs are a mix of hatchery and indigenous fish with indigenous fish comprising 50-70 percent of the total run (USFS 1996). Winter steelhead have been sporadically stocked or supplemented in the Hood River since 1962. Winter steelhead are found in both the East and Middle Forks of the Hood River but, based on radio-telemetry data, relatively few travel as far as the Mt. Hood National Forest (Olsen et al. 1995, 1996). Adult migration into the Hood River for each year class begins in December and is completed in May or June the following calendar year. Peak migration for is in April and May.

Mid-Columbia River (MCR) steelhead and their critical habitat are present in the North Fork Mill-South Fork Mill Creek 6th field subwatershed but are not present in the action area. MCR Steelhead have been documented by ODFW up to Mill Creek Falls (RM 3.0) on South Fork Mill Creek, which is 8 miles downstream of Crow Creek Reservoir. Since LFH for MCR steelhead is not in the Action Area, this species will not be discussed further in this BA.

Adult LCR steelhead are likely present in the EFHR and the lower reaches of Dog River. Spring spawning surveys are difficult in the action area due to weather and high flows thus little steelhead redd survey data is available.

Growth and survival characteristics appear to be stable. Successful spawning occurs in the East Fork Hood River and tributaries. Removal of Powerdale Dam eliminated the last, and largest, significant barrier to up and downstream passage in the Hood River Basin. Highway and other roads adjacent to streams have reduced habitat complexity within some stream reaches in the action area, notably the mouth of Dog River, as well adjacent East Fork Hood River. This has likely affected the quantity and quality of rearing habitat for steelhead trout. Water temperature within the action area is well within the suitable range for steelhead spawning and rearing.

Coho Salmon

Originally part of a larger lower Columbia River/southwest Washington ESU, LCR Coho were identified as a separate ESU and listed as threatened on June 28, 2005. NOAA Fisheries issued results of a five-year review on August 15, 2011 and concluded that this species should remain listed as threatened. Critical habitat for LCR Coho Salmon was designated in February 2016.

The ESU includes all naturally spawned populations of Coho Salmon in the Columbia River and its tributaries in Washington and Oregon, from the mouth of the Columbia up to and including the Big White Salmon and Hood Rivers. There is no artificial propagation program for Coho Salmon in the Hood River Basin.

Coho Salmon distribution is based on limited survey information obtained from Confederated Tribes of Warm Springs and ODFW. Distribution and critical habitat of the LCR Coho ESU within the action area and is commensurate with designated critical habitat.

Coho salmon are a minority anadromous species in the Hood River compared with Chinook Salmon and Steelhead. The number of returning adults varies widely, averaging 243 per year but ranged from 13 to 1020 in the period 1992 - 2009 (Table 1), and a large proportion of the escapement is made up of hatchery strays from other river systems (Reagan 2011). The unmarked portion of the run each year is only a fraction of the entire run. For the 2009 run year, the last year Coho were trapped and counted prior to the decommissioning of Powerdale Dam (and fish passage facility), 70 natural and 563 stray hatchery Coho salmon passed upstream into the Hood River.

Coho distribution in the Hood River and especially the action area is not as well understood as Chinook salmon and steelhead. Little distribution and spawning survey monitoring has focused specifically on Coho. Neither the Confederated Tribes of the Warm Springs Reservation of Oregon (CTWS) nor ODFW conduct spawning surveys specifically for Coho but spawning has been noted in the lower East Fork Hood River and some tributaries. Spawning surveys in the action area have included the mouths of Dog River, Puppy Creek, Tilly Jane Creek, and Ash Creek. No Coho spawners were detected in 2014 in these 4 reaches, although juveniles have been noted in CTWS 2010 and 2011 snorkel surveys.

Upper limits for LCR Coho Salmon ends at the Puppy Creek confluence with Dog River (RM 0.14) due to steep gradient beyond this point. Listed critical habitat for Coho Salmon ends upstream in Dog River at RM 1.4, at the Forest Boundary.

Growth and survival characteristics appear to be stable although the population is small. Based on the intermittent presence of juveniles in the action area, successful spawning is occurring, likely downstream in the mainstem East Fork, as well as possibly Dog River in the action area. Removal of Powerdale Dam eliminated the last, and largest, significant barrier to up and downstream passage in the Hood River Basin. Highway and other roads adjacent to streams have reduced habitat complexity within some stream reaches in the action area, notably East Fork Hood River. This has likely affected the quantity and quality of rearing habitat for Coho salmon. Side channel and alcove habitat are not prevalent in many stream reaches in the action area, but this is within natural conditions given the valley confinement and gradient. Water temperature within the action area is well within the suitable range for Coho spawning and rearing.

Spring Chinook Salmon

Lower Columbia River Evolutionary Significant Unit (ESU) Chinook salmon was listed as threatened on March 24, 1999 and their threatened status was reaffirmed on June 28, 2005. In 2014, updates to listed stock was completed. LCR Chinook stock in the Hood River basin was extirpated in the mid 1990's, and a run has been reintroduced originating from the Round Butte hatchery on the Deschutes River (CTWS and ODFW, 2000). As of 2014, the present Hood River spring-run Chinook hatchery stock is not an ESA-listed population under the ESA (FR Vol 79: 20802-20817; April 14, 2014). A final critical habitat designation was published on September 2, 2005, with an effective date of January 2, 2006, and remains unchanged at current time.

Distribution and critical habitat of the LCR chinook ESU within the action area. EFH in the action area is commensurate with designated critical habitat.

Spring Chinook salmon are present in the action area. Fall Chinook salmon are found lower in the Hood River Basin outside of the action area.

CTWS has conducted annual spring Chinook salmon spawning surveys since 2008 (CTWS 2017). Redds have been observed in Dog River eight of the nine years monitored. While spring Chinook spawning is common in

Dog River, it appears to be very restricted as all redds have been observed downstream of the Highway 35 culvert (RM 0.07).

The native Hood River spring Chinook run is extinct (CTWS and ODFW 1991), but the (non-ESA) population was reintroduced in the mid-1990s from Deschutes River stock and supplementation continues to the present. Chinook typically enter the Hood River beginning in April and spawning commences the following August through September. Numbers of returning spring Chinook salmon adults to the Hood River averaged 500 per year and ranged from 85 to 1236 from 1992 to 2010.

Upper limits for LCR chinook and Coho salmon ends at the Puppy Creek confluence with Dog River (RM 0.14) due to steep gradient beyond this point. Designated critical habitat for Chinook salmon stops at Highway 35 crossing at RM 0.07 in Dog River.

Growth and survival characteristics appear to be stable. Removal of Powerdale Dam eliminated the last, and largest, significant barrier to up and downstream passage in the Hood River Basin. Water temperature within the action area is well within the suitable range for Chinook spawning and rearing.

Inland Columbia Basin Redband Trout

Inland redband trout may be present in the North Fork Mill and South Fork Mill Creek 6th field subwatershed, but are not present in project area or action area (area of influence). Rainbow trout identified as redband had a high frequency of the redband allele, thus it is assumed they are the inland variety (Gregg et al., 1995). Genetic analysis of salmonids from the mainstem of Mill Creek indicated a mixed population of inland redband and coastal cutthroat trout immediately below the confluence of the North and South Forks, predominantly redband trout. Progressing downstream, coastal cutthroat trout presence dissipated giving way to a pure inland redband population. Salmonids in South Fork Mill Creek above Mill Creek Falls are cutthroat trout (USFS, 2000). Redband are not known to be present in Dog River. For this analysis, resident inland redband trout distribution is assumed to be identical to steelhead distribution.

Coastal cutthroat trout

Coastal cutthroat trout are known to be present in Dog River up to about RM 8.5 and in Brooks Meadow Creek from its confluence with Dog River upstream to the FS road 17 crossing (RM 0.3). The FS road 17 culvert is considered to be a fish passage barrier (Figure 1). It is not presently known if coastal cutthroat trout are present in Brooks Meadow Creek upstream of FS road 17 crossing. However, cutthroat trout have been observed in Brooks Meadow (USFS, 1999, MHNF, unpublished data).

Coastal cutthroat trout are the only salmonids known to be present in South Fork Mill Creek above Mill Creek Falls. Forest Service personnel have observed cutthroat trout while electrofishing and made visual observation of salmonids during surveys in South Fork Mill Creek up to RM 16.3 (USFS, 1999, MHNF, unpublished data). The Dog River water transmission pipeline augments stream flows and may act as a corridor for fish passage from the East Fork Hood River watershed to the South Fork Mill Creek drainage. The water transmission pipe is not currently screened at its inlet side and diverts approximately 3-10 cfs from June through October. A 2010 genetic analysis (Smith et al. 2010), conducted by MHNF, ODFW, and USFWS Abernathy Fish Technology Center, found cutthroat trout tissue samples collected in the Upper Dog River (above the Dog River diversion headgate), South Fork Mill Creek, and Crow Creek (a tributary to South Fork Mill Creek) were from the same genetic population group.

Pacific lamprey

Pacific lamprey are listed as a state sensitive species and a U.S. Fish and Wildlife Service Species of Concern. Upper limit data for Pacific lamprey is very limited in both the East Fork Hood River and Mill Creek 5th Field Watersheds. In general, little is known about lamprey presence in the project area or area of influence. The upper limit for Pacific lamprey is presumed to be the lower reach of Dog River below Dog River falls (Rod French, ODFW, personal communication, 2017). Upper limits for Pacific lamprey in South Fork Mill Creek is likely Mill Creek falls at RM 3.0.

Pacific lamprey migrate from freshwater streams to the Pacific Ocean, then return upstream to spawn. Typical spawning habitat is similar to that for salmon or steelhead trout, in medium- and large-sized, low-gradient rivers and streams. Lampreys construct a nest (called a redd) in small gravel substrate. Females can lay up to 100,000 eggs, which are fertilized externally by the male. Adult lampreys die within four days of spawning. Pacific lampreys spend most of their life in freshwater streams before entering the ocean as adults to feed. Young lamprey burrow into the muddy bottoms of backwater pools and eddies, where they filter the mud and water. The juveniles, called ammocoetes, live in fresh water for up to 5 or 6 years. Juvenile lampreys are filter feeders. After a two-month metamorphosis they emerge as adults less than 5 inches long, then migrate downstream to saltwater. In the ocean they grow to 16 to 27 inches before returning after 1 or 2 years to fresh water to spawn and die. Adults are parasitic on other fish, scavenge, or are predators while in the ocean. Pacific lampreys do not feed while traveling to spawn. Pacific lampreys are vulnerable to habitat losses due to reduced river flows, water diversions, dredging, streambed scouring, channelization, inadequate protection of streamside vegetation, chemical pollution and spills, and impeded upstream passage due to dams and poorly designed road culverts.

Dalles Juga

This species of aquatic mollusk has been found in Mill Creek and the central and eastern Columbia River Gorge from Hood River to The Dalles, in Hood River and Wasco Counties, Oregon, and Skamania County, Washington (Frest and Johannes 1995). The Dalles juga is found at low elevation large springs and small-medium streams with a stable gravel substrate and fast-flowing, unpolluted, highly-oxygenated cold water. Relatively few macrophytes or epiphytic algal taxa are present, with *Rorippa* being the most frequently encountered. The species cannot survive long out of water (Frest and Johannes 1995).

The Columbia dusksnail and Basalt Juga have been documented on the MHN. Prior to summer of 2015 the Columbia dusksnails found on MHN were believed to be (*Colligyrus* sp. nov.), but after DNA analysis was conducted in 2015 by Liu H-P, Hershler R. Rossel C (2015), specimens taken from the Dog River subwatershed (Brooks Meadow Creek), were determined to be Rocky Mountain dusksnail (*Colligyrus greggi*), which are not on the 2015 Regional Forester's Special Status Species List. Basalt Juga has only been found on MHN in the North Fork Mill Creek drainage. Since these two species are Survey and Manage species rather than Special Status Species, they will not be discussed further in this document.

3.4.2 Effects Analysis/Environmental Consequences

Direct and Indirect Effects

Direct Effects. Direct effects are those that occur during project implementation. To directly impact aquatic species/habitat the activity needs to be in close proximity to the water body where they reside, often within the water body itself. From an aquatic perspective, direct effects most often result in disturbance to aquatic organisms—forcing movement or a flight response. Depending on the activity, it is possible that individuals can be injured or killed; this is almost always a result of people or equipment working directly in water.

In this case, the culvert replacement could directly affect fish and other sensitive aquatic organisms that are adjacent to or immediately downstream of the project. Direct effects to fish species could include reduced

feeding efficiency during times of increased turbidity, the possibility of individual mortality during construction, and capture of resident cutthroat trout during work area isolation.

Fish rely on sight to feed so feeding success could be hampered during those times turbidity is increased. This would be a short-term effect since turbid conditions would dissipate soon after the in-stream work phase was completed; generally in a few hours. Any time there is digging or equipment (including the placement of large wood) in the live stream channel there is a possibility that fish could be killed or seriously injured by being crushed or run over by equipment or materials. Because aquatic macroinvertebrates are relatively immobile, especially mollusks, it is likely such organisms would be injured or killed during construction if they are present at the site. This impact would occur at the site scale and not across the range of any aquatic macroinvertebrate species thus, the effects would be localized.

Pre and post project surveys of fish and/or habitat will be conducted at the culvert crossing. When these surveys are carried out within or in close proximity to streams, harassment of fish can occur. In some instances, fish are flushed from hiding cover and can become more susceptible to predation. The disturbance typically lasts a few hours and will not have population level effects and is considered to be negligible at the 6th field and project scale.

Following in-water work guidelines, and the strict adherence to applicable PDC's, would limit the direct effects on fish and aquatic mollusk species and result in negligible effects at the watershed scale.

Indirect Effects. Indirect effects are effects caused by or resulting from the proposed actions, are later in time, and are reasonably certain to occur. For example, when streamside forests are removed, an indirect effect associated with shade reduction could be an increase in water temperature. The magnitude of such an effect, if it occurred, would depend on the amount of vegetation removed, location and elevation of the stream, amount of stream flow, etc. In this case, indirect effects may affect resident trout present within close proximity to the restoration actions but have little to no effect on ESA species or LFH present farther downstream.

Methodology

This effects analysis utilizes research, relevant monitoring, field data, previous experience and professional judgment, as well as GIS information, to provide the context, amount, and duration of potential effects on aquatic resources from the proposed project. The physical scientist reports on Hydrology provide the basis for the analysis for effects to aquatic habitat. The analysis method utilized to determine potential impact to fish, aquatic invertebrates, and their associated habitat are listed below.

Determine known and suspected locations of federally listed or proposed aquatic species, designated critical habitat, essential fish habitat, Region 6 Regional Forester's sensitive species and survey and manage species in relation to proposed project activities.

Assess proposed project activities and determine the aquatic habitat elements potentially impacted and the geographic area where effects could occur (i.e., the action area).

Overlap the species/habitat locations with the action area and determine which species/habitat could be affected by project activities.

When species/habitat overlaps with the action area impacts are predicted from proposed project activities to individuals and their associated habitat.

Potential effects to aquatic fauna and habitat were determined from the following:

- Direct and/or indirect effects to individuals from proposed activities;

- Potential reductions in stream shade and subsequent increases in water temperature compared to existing levels;

Potential increases in erosion and fine sediment input to streams and wetlands compared to existing levels;

Potential impacts to existing and future levels of large wood in stream channels and Riparian Reserves, including any impacts to large wood recruitment;

Potential impacts to the quantity and quality of pool habitat; and,

Cumulative effects associated with ongoing or proposed projects in the action area or close enough so that cumulative effects could occur.

Where impacts to individuals or habitat parameters discussed above result from proposed project activities, the potential impacts to aquatic species/habitat were analyzed and then the effects to the biological resource were determined based on professional experience, applicable surveys/studies, and available literature/research.

Proposed Action Alternative

The effects to baseline habitat indicators were assessed for each of the project elements: 1) Removal of old pipeline/installation of new pipeline; 2) Installation of AOP on Brooks Meadow Creek; 3) Installation of fish screen/ladder and diversion/outlet structures; 4) Temporary staging areas/material hauling; and 5) Pipeline operations. Potential effects (negative, positive, or neutral) that the implementation of each project element may have on each indicator or group of indicators was assessed, where applicable, using the AP factors as defined below:

Table 7. Definition of effect terms (fisheries)

Proximity	The geographic relationship between the project element or action and the species/designated critical habitat.
Probability	The likelihood that the species or habitat will be exposed to the biotic or abiotic effects of the project element or action to the indicator.
Magnitude	The severity and intensity of the effect.
Distribution	The geographic area in which the disturbance would occur (may be several small effects or one large effect).
Frequency	How often the effect would occur.
Duration	How long the effect would last. Potential categories include (a) short-term event whose effects subside immediately (pulse effect); (b) sustained, long- term effect, or chronic effect whose effects persist (press effect); and (c) permanent event that sets a new threshold for a species' environment (threshold effect).
Timing	When the effect would occur in relation to the species' life-history patterns.
Nature	Effects of the action on elements of a species' life cycle, population size or variability, or distribution; or on the primary constituent elements of critical habitat, including direct and indirect effects.

As the AP directs, the Proximity, Probability, and Magnitude factors are considered first. The first three factors allow for a quick evaluation of project elements with insignificant, discountable, or no effects without further

factor analysis. The combined effects to each of the indicators were also assessed for the entire project (indicator summary).

Project Effects to Habitat Indicators

Temperature

Baseline condition: Properly Functioning

1) Abandonment of Old Pipeline/Installation of New Pipeline

Proximity: The primary elements of the project are the abandonment in place of the old 18" wooden pipeline and installation of the new 24" ductile iron pipeline. Existing trees and dead wood will be cut and removed within the 25-foot pipeline right-of-way along the pipeline route within the pipeline service road. It is estimated that less than 600 trees total will be removed along the 3.6-mile pipeline route. Around 11 acres total would be affected. This project element does not involve in-water work. At its closest point, this affected Riparian Reserve area is about 2.7 miles upstream of Listed Fish Habitat (LFH), and 3.3 miles upstream of CH, in Dog River. Tree falling outside of 1 Site Potential Tree height (130') has no causal mechanism to affect stream shading that would affect water temperature, thus tree falling in 2.92 out of the total 3.6 mile pipeline will have a **Neutral** effect on water temperature. Tree falling to replace the diversion outlet in headwaters of SF Mill Creek has no possibility of affecting LFH because of the pronounced distance (>11 miles from pipeline outlet to LFH), and more significantly, the juxtaposition of an impoundment (28-acre Crow Creek reservoir/dam) that disconnects potential project impacts from LFH.

Probability: Tree removal within a site potential tree height has the potential to affect stream temperature through removal of tree canopy that provides shade to streams. Approximately 0.68 miles (3,615') of pipeline road will have trees removed within this zone of Dog River and the mouth of Brooks Meadow Creek. The removal of trees in this zone will have **discountable** effect to stream temperature in LFH due to the following:

- 0.3 miles out of the 0.68 miles pipeline opening is only on the north side of the stream. Little stream shading is provided by trees on the north bank.
- A very small amount (815') of pipeline is within 100' (of one side) of the stream. The majority of the pipeline that is 100-130' away from the stream will have additional shading provided by 100' of undisturbed over story trees, understory hardwoods, and streamside shrubs.
- At its closest point, this affected riparian area is about 2.7 miles upstream of Listed Fish Habitat (LFH), and there are 6 cold water tributaries between this point and LFH (tributaries contributed 4.5-10 °C flow when recorded during August 2000).
- The riparian corridor is intact and densely forested the entire length from the diversion to LFH.

Element Summary (abandonment of old pipeline/installation of new pipeline):

Based on the existing cold-water conditions in Dog River, the presence of numerous cold water seeps and springs in the area, the extended distance from the project element action to LFH, and the existing densely forested shade conditions downstream of the action, the tree removal related to pipeline abandonment and installation will result in **discountable** effect to water temperature in LFH within the action area.

2) Installation of AOP and pipeline crossing at Brooks Meadow Creek

Brooks Meadow Creek is a small (<1 cfs during summer) spring-fed stream that stays cold year-round. A 2000 USFS stream survey measured the mouth at 10°C in early August, and field visits in summer of 2016 confirm the very cold stream temperatures in the portion that runs through Brooks Meadow. It is unlikely that any mature trees will need to be removed to install the AOP culvert at the Brooks Meadow Creek crossing. Vegetation removal at the crossing will largely consist of brushing low vegetation rather than removal of mature trees.

Proximity: The pipeline crossing is approximately 2.9 miles upstream of LFH, with the AOP installation at approximately 3.0 miles upstream of LFH.

Probability: Since few, if any, over-story trees are will be affected by the AOP installation, this action will have **neutral** effect on water temperature. Tree removal has the potential to affect stream temperature through removal of trees that provide shade to streams. Tree removal adjacent to Brooks Meadow Creek accounts for about 0.06 acres of opening. The 25 wide opening will be perpendicular to the stream and thus still retain mature trees immediately adjacent to this small section of opening that will provide shade for the majority of the day. There is **discountable** chance that stream temperatures in LFH will be affected by this element due to the very slight increase in solar contribution at the crossing site, which is located 2.9 miles upstream of LFH. This is especially true since 4 tributaries enter Dog River between the project site and LFH, with contributions of 5-7°C flow, as measured during August 2000.

Element Summary (Installation of AOP and pipeline crossing at Brooks Meadow Creek): Tree removal related to installation of these 2 structure will have **discountable** probability to affect stream temperature due to the very small amount of disturbance area (0.06 acres) and the pronounced distance (2.9 miles) to downstream LFH.

3) Installation of fish screen and diversion/outlet structures

The installation of fish screen and diversion structures are within the footprint of existing disturbed areas. As no shading of the stream will be affected, this project element has no causal mechanism to affect stream temperature. Therefore, installation of fish screening and diversion/outlet structures will have a **neutral** effect on stream temperatures.

4) Temporary Staging Areas/Material Hauling

The following discussion addresses temporary staging areas, materials hauling, and related road maintenance for this project element.

Proximity: None of the temporary staging areas are in riparian reserve, thus there is no causal mechanism to affect stream shade. Timber and rock haul, regardless of location or duration, will not reduce shade and has no causal mechanism to increase water temperature. Therefore, both temporary staging areas and timber/rock hauling will have a **neutral** effect on water temperature. Road maintenance has the potential to remove shade producing vegetation through danger tree removal near perennial streams. Proposed roads maintenance (that includes danger tree treatment) are all located outside Riparian Reserves, except for the Dog River pipeline access road (Rd 1700-014 and 4400-011), which is within 100' of Dog River and Brooks Meadow Creek for about 815'. This native surface pipeline access road is about 2.7 miles upstream of LFH, at its closest point (3.3 upstream of CH).

Probability: Approximately 815' of pipeline road may have some danger trees removed within 100' of Dog River and the mouth of Brooks Meadow Creek.

The removal of a few danger trees in this zone will have **discountable** effect to stream temperature in LFH due to the following:

- A very small amount (815') of road is being treated, with <10 danger trees expected to need falling.
- At its closest point, this affected riparian area is about 2.7 miles upstream of Listed Fish Habitat (LFH), and there are 6 cold water tributaries between this point and LFH (tributaries contributed 4.5-10 °C flow when recorded during August 2000).
- Other than the 815', the riparian corridor is intact and densely forested the entire length from the diversion to LFH.

Element Summary: (Temporary Staging Areas/Material Hauling): No shade canopy over streams will be removed by temporary staging area and timber/rock haul, therefore, these actions will have **neutral** effect to stream temperature. A slight reduction in shade at the site scale may occur from danger tree falling, although the actual shade reduction would be minimal since <10 trees is expected to need treatment within the 815' section of road within 100' of resident fish bearing streams. Since these streams are around 2.7 miles upstream of LFH and numerous cold water tributaries (4.5-10 °C in summer) contribute flow between this action and LFH, danger tree falling will result in **discountable** effects to the stream temperature indicator at LFH.

5) Pipeline Operations

Current operations entails the diversion of Dog River flow year-round. The entire flow of the river has typically been diverted by The Dalles from June through October (approximately 3–10 cfs); however, only a portion of flows from November to May (approximately 30%–70%) are diverted. The proposed project will modify the current pipeline operations by leaving a minimum instream flow of 0.5 cfs (September 1 to October 31) during a portion of the low stream flow period. The new 24" pipeline has a total capacity of 26.3 cfs as compared to the current capacity of 12.3 cfs (a 114% increase). The expanded capacity would allow the filling of Crow Creek Reservoir faster by diverting a greater portion of the Dog River peak flows when available. Once the reservoir is full (historically by early February), pipeline diverted flows are reduced to around 3 cfs for the remainder of winter and early spring.

Flow diversions from the spring to fall of 2016 ranged from around 2.7 cfs in late September to 10.2 cfs in late May 2016, whereas Dog River flows ranged from 2.4 cfs in late September to 21 cfs in early May 2016. Although the entire flow of the river is diverted in the summer, surface flows are replaced by groundwater immediately downstream of the diversion. A USFS stream survey from July 26 – August 30 of 2000 noted wetted stream channel in all areas downstream of the diversion. The discharge rate of 8.3 cfs was recorded at the mouth on July 26, 2000.

Proximity: The diversion is located at RM 6.0, and is 3.4 miles upstream of LFH in Dog River.

Changes in pipeline operations from the diversion point to Crow Creek Reservoir has **neutral** possibility of affecting LFH in SF Mill Creek because there are no proposed changes to operations downstream of the reservoir, which is 7 miles upstream of LFH.

Probability: Diversion of surface flow has the potential to increase downstream temperatures due to the lowered volume, reduced depth, and decreased buffering capacity, which is more prone to warming from solar exposure.

As displayed in the baseline temperature data, Dog River is a very cold system year-round within LFH and almost always meets the 13°C requirements of listed fish species based on the ODEQ criteria. Current stream temperatures are warmest (above 10°C) generally from June to September in the 11 years of available data. The proposed action will divert the same amount of flow (all available surface water) from June to August, while leaving more instream flow (0.5 cfs) in September through October than current conditions. As flow diversion will either be the same or lesser in amount during the warmest period (June-September) with the proposed action, there will be **discountable** effects to stream temperatures in Dog River LFH from current conditions.

Element Summary (Pipeline Operations): The potential for effects to water temperature in South Fork Mill Creek from pipeline operations is **neutral**. The proposed action will divert the same amount of flow (all available surface water) from June to August, while leaving more instream flow (0.5 cfs) in September through October than current conditions. As flow diversion will either be the same or lesser in amount during the warmest period (June-September) with the proposed action, there will be **discountable** effects to stream temperatures in LFH.

Indicator Summary (Temperature)

After field validation of stream habitat in the action area, PDCs were developed by the inter-disciplinary team to minimize water quality impacts, including any from reduction of shade that may affect stream temperature. Some minor shade reduction may occur on perennial resident fish-only streams within the action area, but effects will be **discountable** at LFH due to the combination of pronounced distance (>2.5 miles), existing cold year-round temperature baseline, cold spring influence (4.5-10 °C summer contribution) from multiple tributaries downstream of the action, a retention of 0.5 cfs minimum instream flow during September-October, and the small fraction (~900') of canopy reduction as compared to intact riparian area in almost all of the action area.

Suspended Sediment – Intergravel DO/Turbidity and Substrate Character

Baseline condition: Functioning at risk for SF Mill Creek, and properly functioning for Dog River.

1) Abandonment of Old Pipeline/Installation of New Pipeline

Proximity: The primary elements of the project are the abandonment in place of the old 18" wooden pipeline and installation of the new 24" ductile iron pipeline. Existing trees and dead wood will be cut and removed within the 25-foot pipeline right-of-way along the pipeline route within the pipeline service road. An excavator will dig approximately a 4-foot deep by 3 to 4-foot wide trench, piling the excavated material to either side. The excavator will place the pipe in the trench and then cover the pipe section with gravel or sand and fill in the ditch with the removed material. Additional gravel or sand will be transported to the excavator by a small rubber-tired or tracked vehicle. This project element does not involve in-water work (except at Brooks Meadow crossing that is described in the project element below). At its closest point, this affected Riparian Reserve area is about 2.7 miles upstream of Listed Fish Habitat (LFH), and 3.3 miles upstream of CH, in Dog River. Installation of a new pipeline outlet in the headwaters of SF Mill Creek has no possibility of affecting LFH because of the pronounced distance (>11 miles from pipeline outlet to LFH), and more significantly, the juxtaposition of an impoundment (28-acre Crow Creek reservoir/dam) that disconnects potential project impacts from LFH.

Probability: Installation of new pipeline adjacent to the existing pipeline does not involve any in-water work. Any potential overland erosion that may introduce suspended sediment to stream channels will not occur as there are PDCs that will be applied. The most pertinent one states, "Temporary Erosion Controls – Place sediment barriers prior to construction around sites where significant levels of erosion may enter the stream directly or through road ditches. Temporary erosion controls will be in place before any significant alteration of the action site and will be removed once the site has been stabilized following construction activities." Due to this and other standard erosion control PDCs in place for this project, the probability that any fine sediment generated during pipeline placement traveling overland and reaching adjacent streams and LFH (2.7 miles downstream) is considered **discountable**.

Element Summary (Abandonment of Old Pipeline/Installation of New Pipeline): This project element does not involve in-water work, and PDCs will prevent any overland connection of sediment to stream channels resulting from new pipeline-related construction. The probability that any fine sediment generated during pipeline placement reaching adjacent streams and LFH (2.7 miles downstream) is considered **discountable**.

2) Installation of AOP and pipeline crossing at Brooks Meadow Creek

Instream excavation will be necessary to install the AOP at the current road ford crossing, as well as install the pipeline under the Brooks Meadows Creek channel.

Proximity: The pipeline crossing is approximately 2.9 miles upstream of LFH on Dog River, with the AOP installation at approximately 3.0 miles upstream of LFH in Dog River. There is no hydrologic connection of this element to SF Mill Creek drainage.

Probability: Excavation work associated with installation of the AOP and the new pipeline at Brooks Meadow Creek could potentially introduce suspended sediment to the Brooks Meadow Creek stream channel. The installation of the AOP culvert as proposed will eliminate an active ford thereby reducing potential turbidity and fine sediment at the site scale that will benefit resident fish species and habitat.

Silt, the sediment size most easily transported and that which usually results in turbid conditions, can be transported over a wide range of flows, even very low flows (Swanston 1991). However, the particles will settle where stream energy drops significantly such as behind obstructions. From 2010 to 2013, turbidity monitoring during all stream culvert removals and/or replacements on the Mt. Hood NF recorded that turbidity plumes were short lived and not visually detectable past 700' feet downstream of the worksite (MHNH, unpublished data as reported annually to NMFS and USFWS; NMFS 2013). Note that these observations were made mostly in anadromous streams that are larger than Dog River so in this smaller stream, most of the silt is not expected to be transported as far as in larger streams.

Turbidity decreases downstream from the source relatively rapidly both in space and time. A study on Idaho and Washington streams by Foltz et al. (2008) found that turbidity decreased by an order of magnitude within 328' of the source following culvert removal, and turbidity dropped to background levels within ½ mile on average. This distance is likely a much longer distance than what would occur in Dog River, as his study included 11 stream crossings, where 7 had no mitigation control in place (no de-watering of construction area and no restrictions on heavy equipment in live water). At the mitigated sites the turbidity and sediment yields directly below the road crossings were many orders of magnitude less than at unmitigated sites. At the three sites with mitigation the peak turbidity during construction (including channel re-watering) was 1,300 mg/L, compared with 9,900 and 22,000 mg/L at the two unmitigated sites. In summary, the probability that fine sediment/turbidity will affect LFH in Dog River is **discountable** due to the following:

- Three years of formal monitoring of forest culvert installation and replacements show sediment/turbidity impacts to extend to a maximum of 700' downstream. Decades of on-site implementation monitoring observations is consistent with the formal monitoring results.
- Studies of culvert work, with much less mitigation controls in place, noted turbidity/sediment impacts up to 0.5 miles downstream. PDCs will be applied at Brooks Meadow Creek sites to minimize sediment introduction to surface waters, including work area isolation during construction and construction timing during lowest flow period (ODFW in-water work window of July 15-August 31).
- LFH is ≥ 2.9 miles downstream of the instream culvert installation and pipeline crossing that has similar, or lesser, instream disturbance as what is described above.

Element Summary (Installation of AOP and pipeline crossing at Brooks Meadow Creek): PDCs will greatly minimize the amount sediment entering the stream channel resulting from pipeline-related construction. There will be **discountable** effect on turbidity and fine sediment levels in LFH due to the extended distance (≥ 2.9 miles) of the project to LFH. The installation of the AOP culvert as proposed will eliminate an active ford crossing thereby reducing potential turbidity and fine sediment at the site scale that will benefit resident fish species and habitat.

3) Installation of fish screen and diversion/outlet structures

Proximity: The diversion structure and fish screen are at RM 6.0 on Dog River; a distance of 3.4 miles upstream of LFH. The outlet structure is on SF Mill Creek, above Crow Creek Reservoir, and has no connection to LFH.

Probability: Intake and outlet structure replacement, and fish screen installation is planned to be completed within the ODFW instream work period of July 15 to August 31 to minimize impacts to fish and habitat. In order to reduce the potential for introduction of sediment into stream channels, streamflow will be diverted around work areas. Upon project completion, the construction site will slowly be re-watered to prevent loss of surface water downstream (as the construction site streambed absorbs water) and to prevent a sudden release of suspended sediment. Monitoring will be completed during re-watering to assure no stranding of aquatic organisms or excessive sediment is released below the construction site. These, along with other standard construction and erosion control PDCs, will greatly reduce sediment/turbidity release into Dog River channel.

Sediment and/or turbidity levels will increase during re-watering and after the first few significant precipitation events post-construction. Turbidity monitoring of all 23 in-water aquatic restoration projects was completed on the Mt. Hood NF from 2010 to 2013. All projects followed pertinent PDCs as required by the ESA consultation BO (NMFS 2013). Restoration projects were diverse in nature, and included culvert removal/replacement, large wood placement (via excavator and helicopter), side channel re-connection, and gravel/wood augmentation (downstream of dammed rivers). Monitoring showed that turbidity plumes were short lived and visually detectable from 25 to 1000 feet downstream of the worksite (MHNF, unpublished data as reported annually to NMFS and USFWS). In-stream wood placements via excavator (in live streams) were the type of project that generally created the longest turbidity plumes downstream. The combination of construction and erosion-control PDCs, as well as the extended distance upstream (3.4 miles) from LFH, eliminates the likelihood of sediment/turbidity to affect LFH, and thus is **discountable** in effect.

Element Summary (Installation of fish screen and diversion/outlet structures: The outlet structure is on SF Mill Creek, above Crow Creek Reservoir, and has no connection to LFH. The potential for suspended sediment and turbidity effects in Dog River from diversion structure replacement and fish screen installation will be minimized at the site scale due to PDCs that will be employed. The combination of construction and erosion-control PDCs, as well as the extended distance upstream (3.4 miles) from LFH, eliminates the likelihood of sediment/turbidity to affect LFH, and thus is discountable in effect.

4) Temporary Staging Areas/Material Hauling

Proximity: There are multiple staging areas identified for the construction period, of which none are in Riparian Reserve. As there are no surface hydrologic connection to streams or other waterbodies (PDC A-5), the use of temporary staging areas will be **neutral** in sediment/turbidity effect to LFH.

Roads where equipment, materials, and gravel or log hauling will occur within the action area are located outside Riparian Reserves with 3 exceptions:

- The Dog River pipeline access road (Rd 1700-014 and 4400-011), which is within 100' of Dog River and Brooks Meadow Creek for about 815'. This native surface pipeline access road has one stream crossing at Brooks Meadow Creek, which is about 3.0 miles upstream of LFH.
- The 1700 road crosses Brooks Meadow Creek. This paved road crossing is about 3.1 miles upstream of LFH. Road sides are densely vegetated at this location. No maintenance will be needed for this road system as associated with this project.
- Oregon Highway 35 (over Dog River near the confluence of EFHR) and Road 4400 which crosses Dog River as well as several smaller streams. These road crossings do cross over LFH. Both roads are paved, have wide shoulders and good drainage. No maintenance will be needed for these road systems as associated with this project.

Probability: The haul on paved Oregon Highway 35, Road 44, and Road 1700, as well as the lack of associated road maintenance actions, will not cause any soil or instream disturbance that would lead to sediment/turbidity effects at the site scale nor at LFH (**neutral** effect).

The native surface Dog River pipeline access road (Rd 1700-014 and 4400-011) will have haul as well as associated road maintenance actions, which include:

- The cleaning of road cross drain culverts, sloping the road to drain, and/or install water bars to help drain surface and reduce sediment flows.
- Place, roll and compact 3/4"(-) aggregate material 100' each direction of road crossing at Brooks Meadow Creek crossing to minimize the delivery of sediment erosion to the stream.
- If road is to be used in the wet season, surface road with 3"(-) aggregate or other surfacing material to minimize sediment flows.

Haul, and associated road maintenance, conducted further from stream channels than the closest drainage relief culvert is not expected to result in sediment increases in area streams because the drainage relief culverts empty onto well-vegetated areas that are not hydrologically connected to stream channels. The presence of well-vegetated buffers between cross drain culvert outlets and streams will be sufficient to halt overland erosion before it can enter streams. Dog River access road has one short point of surface hydrologic connection to streams at the Brooks Meadow Creek crossing. The stream at this location is <1 cfs summer flow, with little annual variation due to its spring-fed source about 1 mile upstream.

Although the entire goal of the road maintenance is to reduce sediment transport from existing conditions (including conversion of native road stream crossing to aggregate surface, installation of water bars to improve draining onto vegetated surfaces and the cleaning of road drain culverts), road maintenance activities does have the potential to increase short-term road crossing related erosion and sediment during rainfall events due to initial soil surface disturbance. Temporary Erosion Controls adjacent to the stream crossing and through road ditches will capture sediment before it enters the stream channel. Any turbidity created by road maintenance activities would most likely be washed from the road or ditch surface in the first few precipitation events immediately after work has been completed. These sporadic events may cause disturbed fine soil to be mobilized downstream and potentially into stream channels for a short time.

Monitoring by MHNH staff on much more extensive in-water restoration projects using heavy machinery have shown that turbidity does not travel downstream beyond 1000' due to PDCs (MHNH, unpublished data as reported annually to NMFS and USFWS). The short extent of turbidity released at this stream crossing is extremely **discountable** to be able to be detected in LFH because of the small stream flow contribution of Brooks Meadow Creek (<1 cfs spring-fed) that is 3.0 miles upstream of the nearest LFH in the much larger Dog River system.

Element Summary (Temporary Staging Areas/Material Hauling): Road work, staging areas, and hauling activities associated with the Project will result in some fine sediment generated at the site-scale; however, this sediment is extremely unlikely to make its way to LFH. Sediment amounts are expected to be very low and of short duration, as well as at an extended distance from LFH (3.0 miles). This project element will have a **discountable** effect on potential sediment/turbidity delivery to LFH.

5) Pipeline Operations

The changes in pipeline operations (diversion flow timing and volume) does not involve any soil disturbance or instream alterations. This project element has no causal mechanism to affect sediment/turbidity, therefore, will have a **neutral** effect on this indicator. Changes in pipeline operations (diversion flow timing and volume) from the diversion point to Crow Creek Reservoir has **neutral** possibility of affecting sediment/turbidity levels in LFH in SF Mill Creek because there are no proposed changes to operations downstream of the reservoir, which is 7 miles upstream of LFH.

Element Summary (Pipeline Operations): Pipeline operations has **neutral** effects to sediment/turbidity levels in the action area as there are no instream work or soil disturbance that will occur in Dog River subwatershed, while Crow Creek Reservoir disconnects any potential sediment/turbidity impacts from LFH in SF Mill Creek.

Indicator Summary (Suspended Sediment – Intergravel DO/Turbidity and Substrate Character): The proposed project will result in disturbed soil in localized areas that has the potential to enter stream channels; primarily associated with diversion structure replacement/fish screening, material hauling, road maintenance, and AOP installation. Sediment/turbidity levels may be detectable at the site scale within resident fish only streams, but will be **discountable** at LFH due to multiple PDCs that minimize sediment mobilization, as well as the pronounced distance (≥ 2.9 miles) between instream work and LFH.

Chemical Contamination/Nutrients

Baseline condition: Properly Functioning

1) Abandonment of the old pipeline/installation of new pipeline, 2) Installation of AOP and pipeline crossing at Brooks Meadow Creek, 3) Installation of fish screen and diversion/outlet structures, 4) Temporary staging areas/material hauling

Proximity: Installation of new pipeline, AOP culvert placement, diversion structure/fish screen and outlet replacement all require heavy equipment that carry and use petrochemicals to work within resident fish stream channels. Distance to LFH varies from 2.9 to 3.4 miles upstream of LFH, depending on the project element. There are multiple staging areas identified for the construction period, of which none are in Riparian Reserve. As there are no surface hydrologic connection to streams or other waterbodies (PDC A-5), the use of temporary staging areas will be **neutral** for potential to contribute chemical/nutrient contaminants to LFH. Roads where equipment, materials, and gravel or log hauling will occur within the action area are located outside Riparian Reserves with 3 exceptions:

- The Dog River pipeline access road (Rd 1700-014 and 4400-011), which is within 100' of Dog River and Brooks Meadow Creek for about 815'. This native surface pipeline access road has one stream crossing at Brooks Meadow Creek, which is about 3.0 miles upstream of LFH.
- The 1700 road crosses Brooks Meadow Creek. This paved road crossing is about 3.1 miles upstream of LFH. Road sides are densely vegetated at this location. No maintenance will be needed for this road system as associated with this project.
- Oregon Highway 35 (over Dog River near the confluence of EFHR) and Road 4400 which crosses Dog River as well as several smaller streams. These road crossings do cross over LFH. Both roads are paved, have wide shoulders and good drainage. No maintenance will be needed for these road systems as associated with this project.

Probability: It is extremely unlikely that heavy equipment and haul vehicles will spill contaminants. Standard construction PDCs are in place to ensure that materials for emergency hazardous materials control are onsite (e.g., silt fence, straw bales, oil-absorbing floating boom whenever surface water is present, as well as requiring all equipment used for instream work be cleaned for petroleum accumulations, and leaks repaired prior to entering the project area. Such equipment includes large machinery, stationary power equipment (e.g., generators, canes, etc.), and gas-powered equipment with tanks larger than five gallons. Based on decades of staff experience that encompasses tens of thousands of log truck loads hauled off the MHNH, as well as use of heavy equipment for in-stream restoration projects, there have been very few chemical spills ever noted. Log/rock/pipe hauling, and use of heavy equipment in-stream will have a **discountable** effect on chemical contamination in LFH.

5) Pipeline operations.

Pipeline operations does not involve the use of any agricultural or industrial contaminants, nor involve use of nutrients, thus has no causal mechanism for contamination in LFH – the effect is **neutral**.

Indicator Summary (Chemical Contamination/Nutrients): With PDCs in place, the potential contaminants used as part of project implementation are not likely to enter the stream network, particularly where listed fish are present. Therefore, there will be a **discountable** effect on the indicator.

Physical Barriers

Baseline condition: Properly Functioning

1) Abandonment of the old pipeline/installation of new pipeline, 2) Installation of AOP and pipeline crossing at Brooks Meadow Creek, 3) Installation of fish screen and diversion/outlet structures, 4) Temporary staging areas/material hauling, 5) Pipeline operations.

Proximity: None of the action elements are located in LFH stream channels thus there is no causal mechanism to affect this indicator. The project elements actions neither corrects nor creates any fish passage barriers for ESA-Listed Species, although resident cutthroat trout will benefit from fish screening of the Dog River diversion structure and replacement of a ford crossing with an AOP culvert in Brooks Meadow Creek. All projects elements has a **neutral** effect to LFH for this indicator within the Action area.

Elements and Indicator Summary (Physical Barriers): The project elements neither corrects nor creates any ESA-Listed fish passage barriers. There is no causal mechanism to affect the indicator, thus there is **neutral effect** on this indicator within the Action area.

Large Woody Debris

Baseline condition: Properly Functioning

Pool Frequency and Quality and Large Pools

Baseline condition: Functioning At Risk

Off-Channel Habitat and Floodplain Connectivity

Baseline condition: Functioning at Risk

Refugia

Baseline condition: Functioning at Risk

Width/Depth Ratio

Baseline condition: Functioning at Risk

Streambank Condition

Baseline condition: Properly Functioning

The stream channel indicators listed above are grouped together in this effects analysis because they are interrelated, and in this action area these indicators are often linked with the amount of in-channel and floodplain large wood.

1) Pipeline Abandonment and Installation of New Pipeline

Proximity: Approximately 600 existing trees will be removed along approximately 1,500 feet of the pipeline corridor in relatively close proximity to aquatic habitat; however, this portion of the pipeline route is not near LFH/CH, therefore, the action will have a **neutral** effect on LFH/CH. No construction activities will be close enough to Dog River to affect stream channel characteristics.

Element Summary: Pipeline abandonment and installation construction activities will not occur near LFH or CH in Dog River or South Fork Mill Creek and will not affect streambank habitat conditions and frequency or quality of pools.

2) Installation of AOP and pipeline burial on Brooks Meadow Creek

Brooks Meadow Creek will be temporarily dammed during the low-flow summer period and the water will be re-routed around the work area as the pipe is being installed. The pipe will be laid under the creek channel and the creek channel will be rehabilitated back to existing channel conditions to the degree possible. A temporary

culvert at the existing crossing could be installed during construction and removed after completion of the project.

Proximity: While these project elements may affect resident cutthroat trout, Brooks Meadow Creek is not located close to LFH/CH. Installation of the AOP and burial of the pipeline will be conducted in areas previously disturbed by a road crossing (ford) and previous pipeline burial and will have a **neutral** effect on LFH/CH, therefore no further analysis is necessary.

Element Summary: Although several trees will be removed to accommodate the improved crossing on Brooks Meadow Creek, the work will have a **neutral** effect on pools, streambank characteristics, and other key channel characteristics used by listed fish species. The loss of several trees will result in a **neutral** effect to streambank condition, but the overall effect of the installation will be **beneficial** to aquatic invertebrates and resident fish in Brooks Meadow Creek because it will eliminate an existing ford through the creek.

3) Installation of Fish Screen/Ladder and Diversion/Outlet Structures

Proximity: The new diversion/outlet structures and the fish screen will be constructed in approximately the same locations as the existing structures; however, these structures are not located in or near LFH/CH. Instream work associated with fish screen and diversion/outlet structures will not affect channel characteristics in the immediate area or in downstream LFH, therefore the effect will be **neutral** and no further analysis is necessary.

Element Summary: PDCs and BMPs will greatly minimize the amount sediment entering Dog River and South Fork Mill Creek during construction of these instream structures. Sediment from this element will have an **insignificant** effect on turbidity and fine sediment levels in LFH/CH.

4) Temporary Staging Areas/Materials Hauling

Proximity: Roads that may potentially generate sediment affecting instream habitat elements are: 4400 Road: closest crossing is 0.2 miles from LFH. 4400011 Road: crosses four perennial and three intermittent streams (2,000 feet in Riparian Reserves); closest perennial and intermittent stream crossings are 0.4 and 0.5 miles from LFH, respectively. 1700 Road: there is an existing pipeline maintenance road with no FS number along the pipeline route that extends into The Dalles watershed. It crosses no perennial or intermittent streams. 1700014 Road: A Transfer Station would be located at the 1700014 road at the top of the hill west of the Brooks Meadow Creek Crossing. The transfer station will be approximately 1 acre in size and accommodate the transfer of pipe from the primary storage area to the construction area, and storage of logs before removal from the site. Minor realignment of the 1700014 road between Brooks Creek Meadow and the Transfer Station will be completed to allow for construction vehicle traffic. The road crosses Brooks Meadow Creek. Danger trees will be removed where needed to provide safe passage for pipeline construction support vehicles. Aggregate materials will be placed and rolled 100 feet in each direction of road crossing to minimize delivery of sediment to the creek. Aggregate will be sloped to drain or water bars will be installed to reduce sediment flows. Turnouts are located approximately every 1000 feet. Road 1700-014 would be the access road for the length of the pipeline. This road is currently a rough, natural surface, single lane road that crosses Brooks Meadow Creek at an unimproved ford. The project will install a cement prefabricated open box culvert, eliminating the need for a ford crossing. Additionally, because the existing pipeline is too fragile to handle surface vehicle traffic, the construction area could be accessed along the newly constructed section of the pipeline. There are several possible locations for storing the pipe and gravel/sand: 1) on either side of the 1700-691 where it intersects with the 1700-690; 2) along road 4400-011 at the junction with road 4400; or, 3) at an old landing off of the 1700 road. Gravel and sand could also be stored at the junction of the 1700 and the 1700-680 roads. Road crossings and landing areas that may affect instream habitat elements are located at least 0.2 miles from LFH/CH and as a result will have a **neutral** effect on LFH/CH.

Magnitude: Fine sediment generated from hauling traffic will increase in action area streams at road crossings. Most of this sediment will disperse and settle before reaching LFH; however, some will eventually

make its way into LFH. As in upper stream reaches this fine sediment will be deposited in slow water habitats, primarily pools and stream margins. The small amount of fine sediment reaching LFH would be immeasurable against background levels, thus sediment deposition in pools will have an **insignificant** effect on pool quantity and quality, and the number of large pools will remain the same. Similarly, sediment deposition will have an **insignificant** effect on stream width to depth ratio and habitat refugia due to the small amount of sediment deposited.

5) Pipeline Operations

Effects of the Dog River pipeline operation on channel characteristics would stem from alteration of the natural hydrograph from replacement pipeline operation and diversion of peak flows to fill the pipeline to capacity. The reduction in peak flows would not function to redistribute substrate and subsequent re-working of the channel configuration, potentially reducing pool depth, LWD density, and habitat heterogeneity (Poff et al. 1997). Diversions associated with the Project will be like the existing pipeline operation (except from September 1 to October 31) and therefore will not represent a significant change from existing conditions. Elevated flows diverted into South Fork Mill Creek from Dog River have the potential to alter stream channel habitat indicators; however, it is unlikely that volumes entering the pipeline will exceed current volumes. Pipeline operations will manage diverted flows so that the erosive effects to the channel from high magnitude surges of water will be minimized.

Probability: Dog River pipeline operations have low probability for affecting stream channel habitat indicators since project operations PDCs will be in place to prevent addition of flow to South Fork Mill Creek during peak runoff periods.

Magnitude: Increased diversion of spring flows beyond the capacity of the existing pipeline will occur infrequently due to the lack of sufficient spring flows and Crow Creek Reservoir storage capacity limitations, therefore the magnitude will be **insignificant**.

Element Summary: Overall, the Dog River Pipeline Project elements will result in **neutral or insignificant** effects to channel habitat indicators as described above. Disturbance is localized and with the exceptions of installation of the AOP structures in Brooks Meadow Creek, the diversion/outlet structures, and the Dog River fish screen and fish ladder are not directly associated with LFH and will be of short duration. These activities are all located well upstream of LFH. There would not be any measurable collective disturbance to the watershed but given the localized effects associated with some these project elements on some habitat indicators (sediment, temperature, flow) there will be an **insignificant** effect from the project in the short-term. While there will be short-term insignificant negative effects, the installation of the fish screen and the addition and maintenance of 0.5 cfs of bypass flow in Dog River during September and October will **benefit** resident trout by stabilizing flows and the amount of available habitat thereby providing a net **positive** effect.

Indicator Summary (Physical Barriers): Due to proximity much of the proposed work associated with project elements would have a neutral effect on pool frequency and quality, large pools, off-channel habitat, refugia, width to depth ratio, streambank condition, and floodplain connectivity. However, portions of some project elements, particularly timber felling in Riparian Reserves, log and rock hauling, road maintenance, road storm-proofing and decommissioning, and culvert removal/replacement will result in some impacts to habitat in terms of shade reduction, fine sediment, and large wood. However, in all cases the effects would be **insignificant** to habitat indicators in LFH due to a variety of factors such as distance from units to LFH and the overall small amount of disturbance.

Change in Peak/Base Flows

Baseline Condition: Functioning at Risk

Pipeline operations is the primary project element affecting potential changes in peak/base flows. Pipeline abandonment and installation of the new pipeline will not affect existing conditions because it will be necessary to maintain diversion of water through a temporary pipe while the new pipeline is under construction. The same is true for installation of the AOP and installation of the new pipeline at Brooks Meadow Creek. Flows will be maintained and diverted during construction activities for all related project structures. Further discussion of potential changes in peak/base flows is included in the pipeline operations element discussion below.

The existing pipeline will be needed to carry water to South Fork Mill Creek until the new pipeline is constructed and operational, therefore, a temporary bypass line will be used to convey water around the construction site. The bypass pipe will consist of an 8-inch aluminum sprinkler-type pipe, which could be moved by hand. Installation of the bypass pipe will be around existing trees, logs, and rock. Brooks Meadow Creek will be dammed during the low-flow summer periods and the water will be re-routed around the work area as the pipe is being installed. The pipe will be laid under the creek channel and the creek channel will be rehabilitated back to existing channel conditions as much as possible. A temporary culvert at the existing crossing could be installed during construction and removed after completion of the project. An existing section of the pipe, approximately 600 feet long, crosses a draw within a 10-foot fill where Surveyor's Ridge trail leaves the 1700-014. The existing fill will be removed and re-contoured along the draw. The new pipeline will be installed along the contour of the line of the drainage. This will allow drainage in the draw to function naturally. The current diversion of water from Dog River into the existing pipeline is not equipped with a fish screen and Oregon Department of Fish and Wildlife (ODFW) staff has confirmed that the proposed project will not be required to provide screening per their current regulation. However, the proposed project is to install a fish screen on the diversion. The proposed structure will be an in-channel screening structure, keeping the fish in the stream without necessitating any bypass flows. The structure may be designed and constructed in a manner that will allow its removal in the winter.

1) Pipeline Abandonment and Installation of New Pipeline

Proximity: The abandonment and installation of the new pipeline will have a **neutral** effect on LFH/CH since flows will be maintained during construction through a temporary bypass pipe. As a result of this assessment, no further analysis is needed.

Probability: Pipeline abandonment and installation will not affect base/peak flows in Dog River and /or South Fork Mill Creek since flows will be maintained during construction through a temporary bypass line. The probability for effects to flows through pipeline construction is **discountable**.

Magnitude: The magnitude of the effect of this element on peak/base flows is **insignificant**.

Element Summary: Sufficient shade will remain along perennial streams in the action area. The probability that tree removal related to temporary road maintenance and staging areas is discountable. The overall effect on peak/base flows from this project element is **neutral**.

2) Installation of AOP on Brooks Meadow Creek

Activities associated with the construction of the project have low potential to cause impacts to water quantity in Brooks Meadow Creek. The damming and diversion of Brooks Meadow Creek during the construction period may result in a temporary decrease in water quantity in the lowest reach of the creek and in Dog River while the AOP (culvert) is being installed; however, the decrease would be temporary and minimal. Additionally, a section of the creek may be transformed into a small reservoir (slower velocities, greater water depths, etc.) until the temporary dam is removed and the creek is routed through the new culvert under the access road.

Proximity: Brooks Meadow Creek is not in close proximity to LFH or CH, therefore the temporary damming and diversion of the creek will not affect listed fish species. The existing ford of Brooks Meadow Creek is approximately 2.1 miles from the nearest LFH/CH. As a result of this proximity assessment, the effect of this action on peak/base flows is **neutral** and no further analysis is needed.

Element Summary: The overall effect on peak/base flows from this project element is **neutral**.

3) Installation of Fish Screen and Diversion/Outlet Structures

This project element has no causal mechanism to affect this indicator as flows will be maintained during construction.

Proximity: The proposed fish screen and diversion/outlet structures in Dog River and South Fork Mill Creek are not in close proximity to LFH or CH and existing flows will be maintained during construction activities, therefore these activities will not affect listed fish species or critical habitat. As a result, the effect of these actions on peak/base flows are expected to be **neutral** and no further analysis is needed.

4) Temporary staging areas/Materials Hauling

Temporary roads and material hauling will not occur in the proximity of LFH/CH therefore the effects of these activities on peak/base flows will be **neutral** and no further analysis is needed.

5) Pipeline Operations

The Proposed Project will divert flows from Dog River into South Fork Mill Creek year-round through a larger (24-inch-diameter) pipeline than currently exists. The replacement of the Dog River pipeline will have low potential for short- and long-term impacts to peak/base flows in the Dog River and South Fork Mill Creek watersheds. A portion of the river's flow will be diverted by the pipeline throughout the year, thus reducing water quantity; although the degree of severity of impacts would vary seasonally and would only change from the existing condition during September 1 to October 31 (Table 4). PDC 10-1 requires a minimum in-stream flow of 0.5 cfs to be remain in the river from September 1 to October 31. The flow in Dog River during these months would increase compared to existing conditions thus reducing the magnitude of water quantity effects. The majority of the Dog River flow (~80%–83%) would still be diverted from the channel during these low-flow periods. The greatest potential for impacts to water quantity would be within Reach 3 of Dog River immediately downstream of the intake; however, inputs from hyporheic flow and perennial tributaries (such as Brooks Meadow Creek) that enter Dog River shortly downstream of the diversion will help recover its surface flow.

During high flow periods (winter and spring) pipeline operations will have the potential to decrease water quantity in Dog River because of the expanded capacity of the replacement pipeline (24-inch diameter) to divert additional water. This expanded capacity will allow The Dalles to fill Crow Creek Reservoir faster by diverting a greater proportion of peak flows when they are available. Once the Reservoir is filled, the amount of diverted flow will be decreased. Pipeline diversions during high-flow periods will decrease the magnitude of peak flows in the river, since up to 26.3 cfs (73% of the estimated D5 flow of 35.9 cfs) (USGS 2017) could be diverted. The diversion capacity of the replacement pipeline will be greater than the average monthly flow in May (15.6 cfs) and June (18.2 cfs) in Dog River upstream of the diversion (MHN 2017a), therefore the pipeline will only be filled during peak runoff events. USGS streamflow records from 1960–1971 indicate that Dog River flows at the site of the diversion may reach 26.3 cfs or greater in 2 of every 3 years; however, the duration of those peak flows will be minimal. The potential to divert the entirety of spring runoff flows into the pipeline will generally be constrained by flow availability (peak flows may only last a matter of hours or days) and Crow Creek Reservoir storage capacity. It is expected that the diversion schedule will be similar to the existing schedule although the larger replacement pipeline will be filled to capacity less frequently, due to the larger capacity of the replacement pipeline. Changes in flows to Reaches 1–3 downstream of the diversion have the potential to be greater than those associated with existing conditions because of the increased capacity

of the replacement pipeline. However, the existing pipeline is rarely filled to capacity due to lack of flow in Dog River and/or Crow Creek Reservoir storage capacity. It is expected that the diversion schedule under the Proposed Action will be similar to existing volumes, although the larger replacement pipeline will be filled to capacity less frequently, due to the larger capacity of the replacement pipeline.

Effects to Reaches 1–3 downstream of the diversion have the potential to be greater than those associated with existing conditions due to the increased capacity of the replacement pipeline. However, the existing pipeline is rarely filled to capacity due to lack of flow in Dog River and/or Crow Creek Reservoir storage capacity. Dog River flows may at times be lower than the OWRD junior instream water right (IWR) recommendations for Coho Salmon, Summer Steelhead, Winter Steelhead, Rainbow Trout, and Cutthroat Trout (CTWS 2017; OWRD 1999) in the lowest reach of Dog River, there is potential for this effect to become greater under the Proposed Action Alternative. However, the OWRD IWR is junior to The Dalles' water right and therefore flows in Reach 1 are not required to meet the OWRD IWR.

Proximity: The Dog River pipeline inlet (Lat/Long is: N 45 24.454 W 121 31.156) is located at about river mile (RM) 6.0 in Dog River, or about 0.5 RM upstream of the Forest Service Rd 4400 in the Dog River 6th field subwatershed of the East Fork Hood River 5th field watershed. The Dog River pipeline outlet (Lat/Long is: N 45 25.904 W 121 31.2544,054) flows into the South Fork Mill Creek at about RM 15.5. South Fork Mill Creek is the primary drainage in the South Fork Mill Creek 6th field subwatershed of the Mill Creek 5th field watershed. Only the lower reaches (reaches 1 and 2) of Dog River include is in proximity to LFH and critical habitat. Effects to LFH in this reach are likely to be discountable because input from hyporheic flow and perennial tributaries such as Brooks Meadow Creek that enter Dog River shortly downstream of the diversion will help recover surface flow diverted through the pipeline.

Probability: The probability of affecting seasonal peak and base flows in LFH/CH within the action area is not discountable. The slight negative effect from this project element is **insignificant** in magnitude and presents no measurable risk to listed species or habitat.

The potential for effects to the quantity of water in South Fork Mill Creek will be low under the Proposed Action although peak flows will have the potential to increase from 12.3 to 26.3 cfs (a 114% increase) with the expanded pipeline capacity. Despite the increased pipeline capacity, the frequency with which the pipeline will be filled to capacity will be low due to the lack of available Dog River flow and Crow Creek Reservoir storage capacity limitations. Additionally, habitat impacts from higher magnitude surges of during peak flows will be minimized through management of pipeline operations.

Magnitude: The Dog River replacement pipeline will have low potential for short- and long-term impacts to peak/base flows within the Dog River watershed. A portion of the river's flow will be diverted by the pipeline throughout the year, thus reducing water quantity; although the severity of impacts will vary seasonally and will only change from the existing condition during September 1 to October 31 due to the inclusion of a Project Design Criterion (PDC; PDC 10-1) that will require a minimum in-stream flow of 0.5 cfs to be left in the river during that period. The flow in Dog River during these months would increase thus reducing the magnitude of water quantity effects. The majority of the Dog River flow (~80%–83%) will still be diverted from the channel during this low-flow period. The only potential for water quantity impacts to LFH will be within Reach 1 (Figure 1, Figure 2) where listed species may be present; however, inputs from hyporheic flow and perennial tributaries (such as Brooks Meadow Creek) that enter the river shortly downstream of the diversion will help to recover surface flow in this lower reach. The existing pipeline is leaky and therefore up to 1.9 cfs may be (incidentally) returned to the Dog River watershed after it is diverted. However, dye studies performed by The Dalles did not conclusively find that pipeline leakage flow is returned to Dog River (MHN 2017c). Under the proposed project scenario, the pipeline will not be expected to leak and all diverted flow will leave the Dog River watershed.

Indicator Summary (Change in Peak/Base Flows): Under the Proposed Action the potential for effects to the Dog River stream channel would be low. Effects would stem from alteration of the natural hydrograph

from replacement pipeline operation and diversion of peak flows to fill the pipeline to capacity. The reduction in peak flows will not function to redistribute substrate and subsequent re-working of the channel configuration, potentially reducing pool depth, LWD density, and habitat heterogeneity (Poff et al. 1997); however, diversions associated with the Proposed Action will be similar to the existing pipeline operation (except from September 1 to October 31; see Table 4), and therefore will not represent a substantial change from existing conditions. Overall, there will be a slight negative effect from this project element but it is **insignificant** in magnitude and presents no risk to listed species or habitat.

Increase in Drainage Network

Baseline Condition: Functioning at Risk

Road Density and Location

Baseline Condition: Functioning at Risk

Indicator Summary: No new permanent road construction will occur in the action area as part of this project. The existing pipeline access road will be brushed and danger trees removed to allow access to the approximately 4 mile long access road. The access road is not hydrologically connected to Dog River or other streams although approximately 1500 feet of the road passes through the Dog River Riparian Reserve. The project will not increase the road density within the action area. There will be a slight from temporary brushing and tree removal activities but the overall impact will to road density will be insignificant.

Disturbance History

Baseline Condition: Functioning at Risk

Indicator Summary: The Dog River Project will result in mostly neutral or insignificant effects to habitat indicators as described above. Disturbance is localized and with a few exceptions not directly associated with LFH. There would not be any measurable disturbance to the watershed beyond existing conditions but given the localized effects associated with some project elements on some habitat indicators there will be an **insignificant** effect from the project in the short-term.

Overall, watershed conditions will improve based on the addition of the AOP at Brooks Meadow Creek, the fish screen at the Dog River pipeline diversion, and the addition of bypass flow to Dog River during the low flow months of September and October.

Riparian Reserves

Baseline Condition: Functioning at Risk

Proximity: Along the entire length of the Dog River pipeline route the pipe crosses one perennial stream channel (Brooks Meadow Creek) and through one small wet meadow (< 1 acre in size), of which both are located at the same riparian reserve segment of Brooks Meadow Creek (Lat/Long is about: N 45 24.776 W 121 31.686). The pipeline route extends from the intake structure in a northerly direction through the eastern riparian reserve of Dog River (both between Dog River and FS road 4400011, as well as underneath FS road 4400011) for about 0.5 RM before crossing under FS road 4400. After the pipeline crosses under FS road 4400 the pipeline continues to travel in a northerly direction in the eastern riparian reserve of Brooks Meadow Creek for about 0.1 RM before it turns in a westerly direction and goes through a small wet meadow and across Brooks Meadow Creek. Forest Service Rd 4400-014 fords across Brooks Meadow Creek just upstream of where the pipeline crosses Brooks Meadow Creek at about RM 0.2. Indicator Summary: Few Riparian Reserve acres will be affected by pipeline removal and installation in the action area and watershed and all impacts will be short-term. There will be a slight loss of large wood recruitment potential from trees removed in the immediate area of the intake and outlet structures. This minor loss of large wood recruitment potential in the riparian reserve will result in a short-term **negative** effect to this indicator; however, in the long-term the effect will be **positive** as riparian stand diversity and diameters increase. Due to the low probability that recruited material will migrate to LFH, the short- and long-term effects are **insignificant** to LFH. Aside from short-term

large wood recruitment, riparian stands will maintain existing shade, connectivity and refugia thus other project elements will have a **neutral** effect.

Disturbance Regime

Baseline Condition: Functioning at Risk

Indicator Summary: The project will have no negative impact on natural processes at the watershed scale; however, slight changes could occur as part of project effects on various indicators, specifically peak and base flows and short-term delivery of sediment to Dog River, Brooks Meadow Creek, and South Fork Mill Creek. These effects are expected to be **insignificant** and not affect underlying processes. For example, although peak flows could change slightly resulting from increased volumes diverted through the larger pipe, overall the changes will be within existing minimum and maximum flow levels as recorded over the last several decades and the shape of the hydrograph will be unaffected. The timing, duration, and magnitude of natural processes will be unaffected at the watershed scale. Because existing natural processes will continue with some **positive** benefit expected, the project will have an **insignificant** effect on this indicator.

Effects Determination

Potential effects to steelhead trout, Chinook salmon, Coho salmon, and resident Cutthroat Trout using a habitat approach is summarized below. The AP provides a dichotomous key which is utilized to reach the appropriate ESA effect determination. Potential effects to water quality or habitat resulting from the project will be substantially diminished and immeasurable by the time they reach known occurrence of LCR chinook, Coho, and steelhead therefore the effects will be discountable and the determination **not likely to adversely affect**. Under the proposed project there will be **no effect** to Middle Columbia River (MCR) steelhead and their critical habitat since they are not known to occur within the project action area. The Magnuson-Stevens Fishery Conservation and Management Act (amended 1996) required designation of Essential Fish Habitat (EFH) for chinook and Coho salmon. The Dog River and East Fork Hood River Basins (HUC 17070105) are designated as current chinook and Coho salmon EFH. Although both species have been documented in the EFHR and lower Dog River, EFH would not be adversely affected (NAA) by the project since project effects will be ameliorated within the distance from the intake structure downstream to their known occurrence.

Coastal Cutthroat Trout: Coastal cutthroat trout are present in the project area where in-water activities will occur. The project may impact coastal cutthroat trout individuals or habitat (MIIH); however, project actions will not likely contribute to a trend towards federal listing since fish present in the immediate area will be relocated prior to in-water work as per project PDCs and BMPs. Impacts are expected to be minimal and localized. The project will likely benefit cutthroat trout by providing additional bypass flow during the typical low flow period (September 1st to October 31st) in Dog River downstream of the intake structure.

Pacific lamprey: Pacific lamprey is thought to be present only in the lower reach of Dog River and the South Fork of Mill Creek although its presence has not been documented. Upper limits for Pacific lamprey in South Fork Mill Creek is likely Mill Creek falls at RM 3.0 and lower Dog River below Dog River falls. Since these limits are well below the immediate project area the effects determination for this species is no impact (NI).

Inland Redband Trout: Inland Redband Trout may be present in the North Fork Mill and South Fork Mill Creek 6th field subwatershed but are not present in the project area or action area. Salmonids in South Fork Mill Creek above Mill Creek Falls are cutthroat trout (USFS, 2000). For this analysis, resident inland Redband Trout distribution is assumed to be the same as MCR steelhead distribution, therefore the effects determination is no impact.

Cumulative Effects

Cumulative effects include the effects of past, present, and reasonably foreseeable future state, tribal, local or private actions that overlap in time and space within the action area (i.e., affected environment) of the Federal action subject to consultations (50 CFR 402.02). The “reasonably foreseeable” clause is a key factor in assessing and applying cumulative effects and could include actions that are permitted, imminent, have an obligation of venture, or have initiated contracts (U.S. Fish and Wildlife Service and NOAA Fisheries 1998). Past and present impacts are incorporated as part of the environmental baseline and discussed here in the effects discussion.

Only those indicators that are effected by the project are included in the cumulative effects analysis (if the action has no direct/indirect effects there would be no cumulative effects). The spatial context for the following cumulative effects analysis is the action area as described previously. Project/activities occurring outside this area may have an effect on aquatic species/habitat, but would not add to those effects from projects proposed in this environmental assessment. The temporal context depends on the existing or future project/activity. If there is an overlap in time from an effects perspective then it is included.

Cumulative effects from an aquatic species and habitat perspective overlap considerably with water quality (sediment delivery, chemicals/nutrients/ peak flows) cumulative effects because most of the attributes analyzed by the hydrologist are directly related to aquatic habitat conditions.

The analysis summary outlined in Table 8 follows a similar format as the cumulative effects table in the Hydrology specialist report.

Table 8. Summary of past, present, and reasonably foreseeable future actions which may contribute to cumulative effects to aquatic fauna and habitat for all alternatives

Project	Potential Effects	Measurable Cumulative Effect?	Extent, Detectable?	Aquatic Species and Stream Habitat Effects
The Dalles Watershed Phase I and II Fuel Reduction	Habitat Indicators	No	An overlap in time and location may exist with this project. Both the fuel reduction project and this project have PDC's in place that prevent measurable effects to the habitat indicators described above.	The habitat indicators for this project were either discountable, neutral, or insignificant. Effects to aquatic species were insignificant at the 6 th field scale with the potential for some effects to individual resident cutthroat and/or aquatic mollusks during project implementation at the site scale. The fuel reduction project has no causal relationship that would accumulate localized effects to resident fish or aquatic mollusks.

Project	Potential Effects	Measurable Cumulative Effect?	Extent, Detectable?	Aquatic Species and Stream Habitat Effects
Timber harvests on federal, county and private lands (including associated road/landing construction) Road decommissioning and road closures	Habitat Indicators	No	An overlap in time and location may exist with this project. On USFS managed land there are PDC's in place that prevent measurable effects to the habitat indicators described above. Private and/or County timber activities in the Dog River and SF Mill Creek watersheds are limited in location and scale as the majority of both watersheds are federally managed. Therefore, the potential for effects to habitat indicators resulting from non-federal timber management are likely immeasurable at the 6 th field scale.	The habitat indicators for this project were either discountable, neutral, or insignificant. Effects to aquatic species were insignificant at the 6 th field scale with the potential for some effects to individual resident cutthroat and/or aquatic mollusks during project implementation at the site scale. Timber harvest activities within the Dog River and Mill Creek watershed could result in some direct localized effects to resident trout and aquatic mollusks but will be limited to isolated locations (such as road crossings) that would have no causal relationship to accumulate measurable effects.
Aquatic Restoration projects	Habitat Indicators	No	An overlap in time and location may exist with this project. Aquatic restoration projects will have long term benefits to the habitat indicators described above.	The habitat indicators for this project were either discountable, neutral, or insignificant. Effects to aquatic species were insignificant at the 6 th field scale with the potential for some effects to individual resident cutthroat and/or aquatic mollusks during project implementation at the site scale. Aquatic restoration projects can result in short term direct effects to aquatic species during implementation but have PDC's in place which limit their duration and magnitude. In the long term they will have beneficial effects to aquatic organisms.

Project	Potential Effects	Measurable Cumulative Effect?	Extent, Detectable?	Aquatic Species and Stream Habitat Effects
Dog River Pipeline Ongoing Operations	Habitat Indicators	No	An overlap in time and location may exist with this project. The ongoing operation of the pipeline has PDC's in place that prevent measurable effects to the habitat indicators described above.	The habitat indicators for this project were either discountable, neutral, or insignificant. Effects to aquatic species were insignificant at the 6 th field scale with the potential for some effects to individual resident cutthroat and/or aquatic mollusks during project implementation at the site scale. The future operations of the pipeline should result in localized benefits to aquatic organisms as the additional 0.5 cfs should provide more water in later summer and the fish screen at the headgate will prevent entrainment of resident trout at that site.
Pre-commercial Thinning	Habitat Indicators	No	An overlap in time and location may exist with this project. Both the pre-commercial thinning projects and this project have PDC's in place that prevent measurable effects to the habitat indicators described above.	The habitat indicators for this project were either discountable, neutral, or insignificant. Effects to aquatic species were insignificant at the 6 th field scale with the potential for some effects to individual resident cutthroat and/or aquatic mollusks during project implementation at the site scale. Pre-commercial thinning projects have no causal relationship that would accumulate localized effects to resident fish or aquatic mollusks.
National Forest System Road and Trail maintenance	Habitat Indicators	No	An overlap in time and location may exist with this project. Both road/trail maintenance projects and this project have PDC's in place that prevent	The habitat indicators for this project were either discountable, neutral, or insignificant. Effects to aquatic species were insignificant at the 6 th field scale with the potential for some effects to individual resident cutthroat and/or aquatic mollusks during project implementation at the site scale. Road/trail maintenance has no causal relationship that would accumulate

Project	Potential Effects	Measurable Cumulative Effect?	Extent, Detectable?	Aquatic Species and Stream Habitat Effects
			measurable effects to the habitat indicators described above. Maintaining roads and trails will be beneficial to the habitat indicators described above.	localized effects to resident fish or aquatic mollusks and may be beneficial at the 6 th field scale.
Site-Specific Noxious Weed Treatments	Habitat Indicators	No	An overlap in time and location may exist with this project. Both weed treatment projects and this project have PDC's in place that prevent measurable effects to the habitat indicators described above. Treating weeks may be beneficial to some of the habitat indicators described above.	The habitat indicators for this project were either discountable, neutral, or insignificant. Effects to aquatic species were insignificant at the 6 th field scale with the potential for some effects to individual resident cutthroat and/or aquatic mollusks during project implementation at the site scale. Weed treatment has no causal relationship that would accumulate localized effects to resident fish or aquatic mollusks and may be beneficial at the 6 th field scale.
Surveyors Ridge Trail Relocation	Habitat Indicators	No	An overlap in time and location may exist with this project. Both the trail relocation project and this project have PDC's in place that prevent measurable effects to the habitat indicators described above.	The habitat indicators for this project were either discountable, neutral, or insignificant. Effects to aquatic species were insignificant at the 6 th field scale with the potential for some effects to individual resident cutthroat and/or aquatic mollusks during project implementation at the site scale. The trail relocation has causal relationship that would accumulate effects to resident fish or aquatic mollusks.
Cooks Meadow Trail Relocation	Habitat Indicators	No	An overlap in time and location may exist with this project. Both	The habitat indicators for this project were either discountable, neutral, or insignificant. Effects to aquatic species were insignificant at the 6 th field scale

Project	Potential Effects	Measurable Cumulative Effect?	Extent, Detectable?	Aquatic Species and Stream Habitat Effects
			the trail relocation project and this project have PDC's in place that prevent measurable effects to the habitat indicators described above.	with the potential for some effects to individual resident cutthroat and/or aquatic mollusks during project implementation at the site scale. The trail relocation has causal relationship that would accumulate effects to resident fish or aquatic mollusks.
Highway 35 road maintenance and sanding	Habitat Indicators	No	An overlap in time and location may exist with this project. Effects to habitat indicators from road side sanding are localized to the shoulders of highway 35 at the Dog River crossing. Any localized effects will not be measurable at the 6 th field scale.	The habitat indicators for this project were either discountable, neutral, or insignificant. Effects to aquatic species were insignificant at the 6 th field scale with the potential for some effects to individual resident cutthroat and/or aquatic mollusks during project implementation at the site scale. Roadside sanding at highway 35 would not measurably accumulate effects to resident fish or aquatic mollusks.
Snowmobile use	Habitat Indicators	No	none	none
Developed and dispersed camping	Habitat Indicators	No	An overlap in time and location may exist with this project. Developed and dispersed recreation is managed to prevent measurable effects to the habitat indicators described above.	The habitat indicators for this project were either discountable, neutral, or insignificant. Effects to aquatic species were insignificant at the 6 th field scale with the potential for some effects to individual resident cutthroat and/or aquatic mollusks during project implementation at the site scale. Recreation has causal relationship that would accumulate effects to resident fish or aquatic mollusks.

Project	Potential Effects	Measurable Cumulative Effect?	Extent, Detectable?	Aquatic Species and Stream Habitat Effects
Dufur Mill Road maint.	Habitat Indicators	No	An overlap in time and location may exist with this project. Both road/trail maintenance projects and this project have PDC's in place that prevent measurable effects to the habitat indicators described above. Maintaining roads will be beneficial to the habitat indicators described above.	The habitat indicators for this project were either discountable, neutral, or insignificant. Effects to aquatic species were insignificant at the 6 th field scale with the potential for some effects to individual resident cutthroat and/or aquatic mollusks during project implementation at the site scale. Road maintenance has no causal relationship that would accumulate localized effects to resident fish or aquatic mollusks and may be beneficial at the 6 th field scale.

3.4.3 Consistency Determination

Forest management activities that may alter aquatic habitat or affect individuals or populations of proposed, endangered, threatened, and sensitive fish and aquatic species require a biological evaluation to be completed (FSM 2671.44 and FSM 2670.32) as part of the National Environmental Policy Act (NEPA) process and Endangered Species Act to determine their potential effects on sensitive, threatened or endangered species. The biological evaluation process (FSM 2672.43) is intended to conduct and document analyses necessary to ensure proposed management actions will not likely jeopardize the continued existence or cause adverse modification of habitat for:

- A. Species listed or proposed to be listed as endangered (E) or threatened (T) by the USDI Fish and Wildlife Service or USDC NOAA Fisheries, and their listed or proposed listed critical habitat.

The biological evaluation process (FSM 2672.41) is also intended to conduct and document analyses to ensure that Forest Service actions do not contribute to loss of viability of any native or desired non-native plant or contribute to animal species or trends toward Federal listing of any species for:

- B. Species listed as sensitive (S) by USDA-Forest Service Region 6.

In addition to the above, the Forest Service is required to assess and disclose the effects of any Federal action on Regional Forester's special status species, as outlined in the Endangered Species Act of 1973 and National Forest Management Act of 1976 (see effects determination section). The Magnuson-Stevens Fishery Conservation and Management Act of 1976 requires the Forest Service to assess and disclose the affects to Essential Fish Habitat. Clean Water Act compliance and consistency with the standard and guidelines outlined in the Northwest Forest Plan Aquatic Conservation Strategy objectives determination is provided for in this analysis and is also discussed in the Hydrology specialist report.

Mt. Hood Land and Resource Management Plan

The Mt. Hood National Forest Plan and the Northwest Forest Plan provide guidance for projects in the form of standards and guidelines. There is overlap between aquatics and water quality in terms of applicable standards and guidelines; therefore, those listed below are directly related to fisheries, or other aquatic special status species. The other water quality standards can be found in the Hydrology specialist report.

Mt. Hood Forest Plan Standards and Guidelines include (pages Four-64, Four-69, Four-257–258):

Fisheries: FW-137, -138, -139, -145, -147

Threatened, Endangered and Sensitive Plants and Animals: FW-174, -175, -176

B7 General Riparian Area: B7-028, -030, -031, -032, -033, -037, -038, -059

Northwest Forest Plan Standards and Guidelines include:

Riparian Reserve Standard and Guides and Aquatic Conservation Strategy (ACS)

3.4.4 Summary of Effects by Alternative

General

This project was designed to minimize negative effects to aquatic habitat, water quality, and ESA listed fish species and sensitive aquatic species through PDCs, while still meeting the resource objectives identified in the proposed action.

This project is located in relatively close proximity to habitat utilized by summer steelhead, spring Chinook and Coho salmon so land management actions are often likely to expose fish to negative effects. However, the implementation of this project will not likely result in negative effects of measurable magnitude to any of the habitat or population indicators. Direct take to any listed fish in the action area will not occur under implementation of any project element.

Table 9. Summary of Effects

Indicator	Action Area Baseline Condition	Pipeline Abandon/ Installation	AOP	Fish Screen/ Inlet/ Outlet	Roads/ Material Hauling	Pipeline Ops.	Indicator Summary
Temperature	PF	I	D	D	D	N	D
Suspended Sediment – DO/Turbidity	FAR	D	D	D	D	D	D
Chemicals/Nutrients	PF	N	N	D	D	N	D
Physical Barriers	PF	N	N	N	N	N	N
Substrate Embeddedness	PF	D	D	D	D	D	I
Large Woody Debris	PF	N	N	N	N	I	I
Pool Frequency and Quality	PF	N	N	N	N	I	I
Large Pools	PF	N	N	N	N	I	I
Off-channel Habitat	FAR	N	N	N	N	I	I
Refugia	FAR	N	N	N	N	I	I

Indicator	Action Area Baseline Condition	Pipeline Abandon/ Installation	AOP	Fish Screen/ Inlet/ Outlet	Roads/ Material Hauling	Pipeline Ops.	Indicator Summary
Width to Depth Ratio	PF	N	N	N	N	I	I
Streambank Condition	PF	I	N	N	N	N	I
Floodplain Connectivity	PF	I	N	N	N	N	I
Change in Peak/Base Flows	FAR	N	N	N	N	N	I
Drainage Network Increase	FAR	N	N	N	N	I	I
Road Density and Location	FAR	N	N	N	N	I	I
Disturbance History	FAR	I	N	N	I	N	I
Riparian Reserves	FAR	N	N	N	N	N	I
Disturbance Regime	FAR	I	N	N	I	I	I
Integration of Species and Habitat	FAR	I	N	N	I	I	I
Table Key	PF= properly Functioning	N= Neutral					
	FAR= Functioning at Risk	D= Discountable					
	NPF= Not properly Functioning	I=Insignificant					

Additional information regarding this resource can be found in the full specialist report which is incorporated by reference and available in the project record.

3.5 Aquatic Conservation Strategy

In order for a project to proceed, “a decision maker must find that the proposed management activity is consistent with the Aquatic Conservation Strategy objectives” (ROD B-10) from the Northwest Forest Plan Record of Decision. The nine objectives are listed on page B-11 of the ROD. Portions of the effects analysis in this document focus on key parameters or indicators that make up elements of the nine Aquatic Conservation Strategy objectives, to determine if the project would restore, maintain, or degrade these indicators. Once this determination is made, the indicators are examined together with the Range of Natural Variability to ascertain whether the project is consistent with the objectives. A description of the range of natural variability of the “important physical and biological components” (ROD B-10) is necessary for determining whether a project “meets” or “does not prevent attainment” of the Aquatic Conservation Strategy objectives (ROD B-10).

The following table displays the individual indicators and the effect the project has on those indicators at the 6th field watershed scale. ACS Objective Indicators for each Alternative. The abbreviations in the table are defined as: R=“Restore” which means the action(s) would result in acceleration of the recovery rate of that indicator; M=“Maintain” which means that the function of an indicator does not change by implementing the action(s) or recovery would continue at its current rate; and, D=“Degrade” which means changing the function of an indicator for the worse.

Table 10. Project Effects on ACS Objectives

Indicators	Project Effects on ACS Objectives
<u>Water Quality:</u>	
Temperature	M
Sediment	M
Chemical Contamination	M
<u>Habitat Access:</u>	
Physical Barriers	M
<u>Habitat Elements:</u>	
Substrate	M
Large Woody Debris	M
Pool Frequency	M
Pool Quality	M
Off-channel Habitat	M
Refugia	M
<u>Channel Conditions and Dynamics:</u>	
Width/Depth Ratio	M
Streambank Condition	M
Floodplain Connectivity	M
<u>Flow/Hydrology:</u>	
Peak/Base Flows	M
Drainage Network Increase	M
<u>Watershed Conditions:</u>	
Riparian Reserves	M

The proposed project was found to have neutral, discountable, or insignificant effects to each of the ACS indicators described above. Therefore, this project maintains ACS objectives at the 6th field scale for Dog River and South Fork Mill Creek.

Additional information regarding this resource can be found in the full specialist report which is incorporated by reference and available in the project record.

3.6 Wildlife

This section is organized into six sections: *Threatened, Endangered and Proposed Species – Northern Spotted Owl; Northern Spotted Owl Critical Habitat; Region 6 Sensitive Species – Gray Wolf, Fringed Myotis, Western Bumblebee, Johnson's Hairstreak; Management Indicator Species – Deer, Elk, Pileated Woodpecker, American Marten, Wild Turkey, Western Gray Squirrel; Snag and Down Log Associated Species; and Neotropical Migratory Birds*. The existing condition, effects analysis, consistency determination, and summary or effects are discussed for each.

3.6.1 Threatened, Endangered and Proposed Species – Northern Spotted Owl

Existing Condition

There are three historic spotted owl territories that overlap the project boundary. All of these home ranges are currently below the threshold of 40 percent suitable habitat and are below 50 percent suitable habitat within the core area. Surveys have been conducted in the project area since 2010 and one spotted owl was detected in 2011. Follow-up visits did not relocate this owl and no other owls have been found. The historic nesting sites are currently considered unoccupied. A first year male spotted owl was detected during surveys for a project adjacent to the proposed pipeline on two separate occasions in August of 2015. The owl was not detected again in subsequent visits and therefore the status of that owl is unknown.

Effects Analysis

No Action Alternative

There would be no short-term effects to spotted owls under this alternative. In the short-term, the portion of the proposed pipeline that is providing dispersal and suitable habitat would continue to function as dispersal and suitable habitat and snag levels would remain essentially unchanged. In 20 to 30 years, the trees along the proposed pipeline could start to differentiate to varying degrees and show an increase in the levels of snags and down wood as live trees continue to die. The quality of habitat would improve only slightly in some stands while improving more in others depending on site conditions.

Proposed Action Alternative

The proposed project is expected to have disturbance to the spotted owl from all phases of pipeline construction. Specifically the disruption will be from chainsaws and heavy equipment. No spotted owls have been found during surveys. If the potential nest sites are unoccupied, then there would be no effect from disturbance to spotted owls from the proposed activities. If a spotted owl nest is found during surveys, that nest patch would be buffered and timing restrictions would be placed on activities that would take place within the disruption distance as defined in Table 11. Because timing restrictions would be in effect in the event that a nest is found, the disturbance from the Proposed Action **may affect, but is not likely to adversely affect** spotted owls.

Table 11. Disturbance and Disruption Distances for Northern Spotted Owls

Disturbance Source	No Effect (March 1 – September 30.)	Disturbance Distance Entire Breeding Period (March 1 – September 30). NLAA (not likely to adversely affect)	Disruption Distance¹ Critical Breeding Period (March 1 – July 15). LAA (likely to adversely affect)	Disruption Distance¹ Latter Breeding Period (July 16 – September 30). LAA (likely to adversely affect)
Use of chainsaws	> 0.25 mile	66 yards to 0.25 mile	≤ 65 yards	No Disruption Anticipated
Use of heavy equipment	> 0.25 mile	66 yards to 0.25 mile	≤ 65 yards	No Disruption Anticipated
Hauling on open roads	> 0.25 mile	≤ 0.25 mile	No Disruption Anticipated	No Disruption Anticipated
Blasting	> 1 mile	0.25 mile to 1 mile	≤ 0.25 mile	≤ 100 yards (injury)
Helicopter – Type I²	> 0.5 mile	266 yards to 0.5 mile	≤ 265 yards	≤ 100 yards (hovering only)
Helicopter – other³	> 0.25 mile	111 yards to 0.25 mi	151 yards to 0.25 mile	≤ 50 yards (hovering only)
Rock crushing		440 yards (0.25 mile)	180 yards	No Disruption Anticipated
Burning	> 1 mile	0.25 mile to 1 mile	≤ 0.25 mile	No Disruption Anticipated

1. Noise distances were developed from a threshold of 92 dB (USFWS 2003). Smoke disturbance distances are based on a FWS white paper (USFWS 2008b). Distances are measured from occupied spotted owl nest tree or fledgling location. If these are not identified, distances are from the edge of nest patch (for both known and potential spotted owl sites).

2. Type I helicopters seat at least 16 people and have a minimum capacity of 5,000 lbs. Both a CH 47 (Chinook) and UH 60 (Blackhawk) are Type I helicopters. Kmax helicopters are considered “other” for the purposes of disturbance. Sound readings from Kmax helicopter logging on the Olympic NF registered 86 dB at 150 yards (Piper 2006).

3. All other helicopters (including Kmax).

Tree removal included in the Proposed Action would be in the form of a 3.4 mile long, 25 foot wide corridor of approximately 10.3 acres. Of these approximate 10.3 acres, roughly 6.1 are in suitable habitat and roughly 4.2 are in dispersal habitat. Within the home ranges, roughly 3.9 acres would be removed from territory 10119P92, roughly 7.8 would be removed from 6035P94, and approximately 4.2 acres would be removed from 6102P90 (Table 12). This habitat removal would not impact the ability of owls to utilize this habitat at the stand scale since the trees that would be removed are spread out across a long narrow corridor rather than in one patch and the function of the habitat within each stand would remain unchanged.

Table 12. Approximate Acres Impacted within Territories

	1101P92	6035P94	6102P90
Acres Suitable Removed	3.9	5.4	1.2
Acres Dispersal Removed	0	2.4	3.0
Total	3.9	7.8	4.2

Because the portion of the project that removes trees in dispersal habitat is spread over a 1.4 mile length, the Proposed Action would not impact the ability of spotted owls to disperse across the landscape and would not change the function of dispersal habitat at the stand scale. Therefore the removal of approximately 4.2 acres of dispersal habitat **may affect but is not likely to adversely affect** spotted owls. Future nesting opportunities would be reduced by removing large trees and snags within suitable habitat and territories that are currently below threshold levels would have habitat removed, therefore, the removal of approximately 6.1 acres is **likely to adversely affect** spotted owls. Because the tree removal is along a narrow corridor, the function of the habitat within these stands would remain unchanged.

The small mammal species that have been found to increase most after tree removal are not ones that are selectively favored by barred owls more than spotted owls. Based on these studies, the proposed pipeline construction would not be expected to expand the range of barred owls since the function of the habitat at the stand scale would remain unchanged.

Cumulative Effects

Of the projects and activities found in Table 1 timber harvest on federal land (past, present, and reasonably foreseeable) was considered in this cumulative effects analysis because the activities overlap in time and space. There is a potential cumulative impact to suitable habitat from the removal of approximately 6 acres of suitable owl habitat. However, this cumulative impact would be minor because the removal of approximately 6 acres represents 0.2% of the available suitable habitat on the landscape. Additionally, cumulative effects to dispersal habitat would not prevent spotted owls from continuing to forage or disperse throughout the analysis area because the 4.2 acres proposed for removal are minor compared to the stand scale. In conclusion, cumulative effects would be minor because the overall function of the northern spotted owl's habitat at the stand-scale would remain unchanged.

Consistency Determination

Late Successional Reserve (LSR) Assessment

The Regional Ecosystem Office (REO) and the interagency Late-Successional Reserve Work Group has reviewed the Surveyors Ridge Late-Successional Reserve Assessment (Assessment). The REO found that

the Assessment provided sufficient framework and context for projects and activities within the LSR, including the Dog River Pipeline replacement. A memorandum dated July 23, 1997 stated that specific projects described in the Assessment that are consistent with the Standards and Guidelines and the treatment criteria identified are exempted from project-level REO review.

Recovery Actions 10 and 32

The proposed project is consistent with the Northwest Forest Plan and with the Revised Northern Spotted Owl Recovery Plan (USFWS 2011).

- *Recovery Action 10:* Conserve spotted owl sites and high value spotted owl habitat to provide additional demographic support to the spotted owl populations.
 - The proposed project does not impact the highest quality.
- *Recovery Action 32:* Because spotted owl recovery requires well distributed, older and more structurally complex multi-layered conifer forests on Federal and non-federal lands across its range, land managers should work with the Service to maintain and restore such habitat while allowing for other threats, such as fire and insects, to be addressed by restoration management actions. These high-quality spotted owl habitat stands are characterized as having large diameter trees, high amounts of canopy cover, and decadence components such as broken-topped live trees, mistletoe, cavities, large snags, and fallen trees.
 - The proposed project was developed in coordination with the Fish and Wildlife Service (FWS) and does not impact and RA 32 habitat.

Consultation

A formal Programmatic Biological Assessment (BA) that included the Dog River Pipeline replacement was submitted to the FWS for the effects to federally listed species including northern spotted owls. The Biological Opinion on the Effects of Projects with the Potential to Modify the Habitat and/or Disrupt Northern Spotted Owls within the Willamette Province, FY 2017, proposed by the Mt. Hood National Forest; and Willamette National Forest; on the Northern Spotted Owl and its' Designated Critical Habitat (FWS Reference Number 01EOFW00-2017-F-0045 and 17-14) was received in August 2017.

Summary of Effects

While the proposed project is expected to have disturbance to the spotted owl from all phases of pipeline construction, no spotted owls have been found during surveys. If the potential nest sites are unoccupied, then there would be no effect from disturbance to spotted owls from the proposed activities.

Tree removal **may affect but is not likely to adversely affect** spotted owls. Future nesting opportunities would be reduced by removing large trees and snags within suitable habitat and territories that are currently below threshold levels would have habitat removed, therefore, the removal of approximately 6.1 acres is **likely to adversely affect** spotted owls. Because the tree removal is along a narrow corridor, the function of the habitat within these stands would remain unchanged.

Additional information regarding this resource can be found in the full specialist report which is incorporated by reference and available in the project record.

3.6.2 Northern Spotted Owl Critical Habitat

Existing Condition

Critical Habitat in the Action Area

Of the 10.3 acres of tree removal for the pipeline, 8.8 acres are in critical habitat. Of the 8.8 acres in critical habitat, 3.7 acres are providing only dispersal habitat (Physical or Biological Feature [PBF] 4) and 5.1 acres are providing suitable habitat for spotted owls (PBF 2, 3 and 4). These PBFs in the action area are functioning at a landscape scale and could support up to 8 territories.

Subunit East Cascade North 7

The Proposed Action is within East Cascades North (ECN), subunit ECN 7. Of the 139,983 acres in this unit, approximately 139,865 are located on the Mt. Hood NF. This unit is located in Wasco and Hood River Counties on the east side of the Cascades with a small portion in Clackamas County on the west side of the Cascades. There are approximately 8.8 acres of critical habitat proposed for removal.

There are approximately 58,397 acres of suitable habitat within subunit ECN 7. Based on the amount of habitat and the average home range size for this Province, this subunit could potentially support up to 48 territories. Of these territories, 3 overlap habitat within the action area.

Special management considerations or protections are required in this subunit to address threats from current and past timber harvest, removal or modification of habitat by forest fires and the effects on vegetation from fire exclusion, and competition with barred owls. This subunit is expected to function primarily for demographic support to the overall population, as well as north-south and east-west connectivity between other subunits and critical habitat units.

Effects Analysis

The analysis area for spotted owl critical habitat includes the Dog River Pipeline project boundary and a 1.2 mile buffer to include any territories that may overlap.

No Action Alternative

There would be no short-term effects to spotted owl critical habitat under this alternative. In the short-term, dispersal habitat (Physical or Biological Features [PBF] 4) would continue to function as dispersal habitat and snag levels would remain essentially unchanged. In 20 to 30 years, the stands could start to differentiate to varying degrees and show an increase in the levels of small snags and small down wood. Stands that are functioning as suitable habitat (PBF 2) would continue to function as suitable habitat.

Proposed Action Alternative

Tree removal in critical habitat would be in the form of an approximate 2.9 mile long, 25 foot wide corridor for a total of 8.8 acres. Of the total acres, approximately 5.1 are in suitable habitat (PBFs 2 and 3) and approximately 3.7 acres are in dispersal habitat (PBF 4). This habitat removal would not impact the ability of owls to utilize this habitat at the stand scale since the trees that would be removed are spread out across a long narrow corridor rather than in one patch and the function of the habitat within each stand would remain unchanged.

Because the portion of the project that removes trees in dispersal habitat is spread over a roughly 1.4 mile length, the Proposed Action would not impact the ability of spotted owls to disperse across the landscape and would not change the function of dispersal habitat at the stand scale. Therefore the removal of approximately 3.7 acres of dispersal habitat **may affect but is not likely to adversely affect** spotted owls. Future nesting opportunities would be reduced by removing large trees and snags within suitable habitat and territories that are currently below threshold levels would have some habitat removed, therefore, the removal of approximately 5.1 acres is **likely to adversely affect** spotted owls. Because the tree removal is along a narrow corridor, the function of the habitat within these stands would remain unchanged.

The Proposed Action maintains the PBFs in a manner that meets the life history needs of the spotted owl at the stand-scale, therefore it would not have significant adverse impacts at the subunit or unit scale.

Cumulative Effects

Of the projects and activities found in Table 1 timber harvest on federal land (past, present, and reasonably foreseeable) was considered in this cumulative effects analysis because the activities overlap in time and space.

Timber harvest on federal lands has reduced the amount of suitable and dispersal habitat (PBFs 2, 3, and 4) on the landscape and will continue to do so into the future until these stands grow over time and become habitat again. With less suitable habitat on the landscape, there are fewer opportunities for spotted owls to successfully nest and produce young. The cumulative effects to dispersal habitat would not prevent spotted owls from continuing to forage or disperse throughout the analysis area.

Consistency Determination

The Proposed Action is consistent with the Critical Habitat (CH) Rule that relies on the recommendations laid out by the Recovery Plan for the spotted owl. The proposed project is not considered active forest management, does not impact the function of PBFs at the stand scale, would not impact the ability of owls to exist on the landscape, and would not preclude the recovery of the species.

Consultation

A formal Programmatic Biological Assessment (BA) that included the Dog River Pipeline replacement was submitted to the Fish and Wildlife Service (FWS) for the effects to federally listed species including northern spotted owls and their critical habitat. The Biological Opinion on the Effects of Projects with the Potential to Modify the Habitat and/or Disrupt Northern Spotted Owls within the Willamette Province, FY 2017, proposed by the Mt. Hood National Forest; and Willamette National Forest; on the Northern Spotted Owl and its' Designated Critical Habitat (FWS Reference Number 01EOFW00-2017-F-0045 and 17-14) was received in August 2017.

Summary of Effects

The habitat removal would not impact the ability of owls to utilize habitat at the stand scale since the trees that would be removed are spread out across a long narrow corridor rather than in one patch resulting in the function of the habitat within each stand to remain unchanged. Therefore the removal of roughly 3.7 acres of dispersal habitat **may affect but is not likely to adversely affect** spotted owls. Future nesting opportunities would be reduced by removing large trees and snags within suitable habitat and territories that are currently below threshold levels would have some habitat removed, therefore, the removal of approximately 5.1 acres is **likely to adversely affect** spotted owls. Because the tree removal is along a narrow corridor, the function of the habitat within these stands would remain unchanged.

Additional information regarding this resource can be found in the full specialist report which is incorporated by reference and available in the project record.

3.6.3 Region 6 Sensitive Species – Gray Wolf, Fringed Myotis, Western Bumblebee, Johnson's Hairstreak

Gray Wolf

Existing Condition

Gray wolves (*Canis lupus*) were reintroduced in the mid-1990s in central Idaho and Yellowstone National Park and then dispersed naturally into Oregon. In 2008 the first wolf pack was confirmed in Oregon on the Umatilla National Forest by Oregon Department of Fish and Wildlife (ODFW) biologists. In May 2001, the FWS delisted wolves in Idaho, Montana, parts of Oregon, Washington, and Utah. In December

2015 the ODFW removed the gray wolf from its endangered species list because the wolf had met the state's population criteria for delisting. Wolves in Oregon west of Hwy 395 remain protected by the federal Endangered Species Act. The FWS is the lead management agency for wolves west of Hwy 395, including those that may be on the Forest.

In March 2015, a male wolf from the Imnaha Pack identified as OR25, moved through the Columbia Basin and southern Blue Mountains before traveling west and spending a number of weeks on the Mt. Hood National Forest. OR25 then traveled south to Klamath County and continues to remain in that area. Because wolves have the ability to disperse over large distances, as in the case of other wolves (OR7 and OR3) that have established territories in southern Oregon, there is the possibility that other undetected wolves have been or may currently be on the Forest. In January, 2018, two wolves were captured on remote sensing cameras in the southeastern portion of the Forest. The breeding status of those wolves is unknown.

Effects Analysis

Analysis Area

The analysis area for gray wolves includes the pipeline and a one mile buffer.

No Action Alternative

There would be no increase in human activities in the area and therefore there would be no effect to wolves.

Proposed Action Alternative

No dens or rendezvous sites have been detected on the Forest or within the project area. The possibility of a wolf den or rendezvous site remaining undetected in the vicinity of the project area is extremely unlikely because of the vocal nature of wolf packs and the amount of human activity that takes place on this part of the Forest. Project related activities would increase human presence during implementation and this may cause wolves to temporarily avoid the area. While the Proposed Action may cause wolves to temporarily avoid the area during project implementation, the Proposed Action is not within a mile of any den or rendezvous site and would not disrupt breeding behavior, therefore, the proposed project would have *no effect* to gray wolf.

Cumulative Effects

Because there is no effect to gray wolf from the Proposed Action, there are no cumulative effects.

Consistency Determination

The Following Mt. Hood National Forest Land and Resource Management Plan Standards and Guidelines that apply to the Proposed Action alternative and would be met:

- FW-174: Habitat for threatened, endangered, and sensitive species has been identified and managed in accordance with the ESA (1973), the Oregon ESA (1987), and FSM 2670.
- FW 177 & 178: Consultation with the USFWS shall occur on each program activity or project that the Forest Service determines may affect threatened or endangered species. Consultation shall be completed before any decision is made on the proposed project.

Consultation

- Because there is no effect to gray wolf from the Proposed Action, consultation is not required for this species.

Summary of Effects

There is no effect to the gray wolf because no dens or rendezvous sites have been detected on the Forest or within the project area.

Fringed Myotis

Existing Condition

The most common habitats in which the Fringed Myotis has been found are oak, pinyon, and juniper woodlands or ponderosa pine and Douglas-fir forest at middle elevations (O'Farrell and Studier 1980, Cockrum et al. 1996, Wilson and Ruff 1999, Ellison et al. 2004). This species is mostly found in dry habitats where open areas are interspersed with mature forests, creating complex mosaics with ample edges and abundant snags. Suitable roosting sites are an important habitat component, the availability of which can determine population sizes and distributions (Humphrey 1975, Kunz 1982). Abundance of large snags and low canopy cover allows more thermal heating of roosts, easier flight access to roosts, and the ability to readily switch roosts, for predator avoidance, or to find more suitable microclimates (Lewis 1995, Weller 2000). Some studies have suggested that fringed myotis consume mostly beetles (Rainey and Pierson 1996), but others in the Pacific Northwest have suggested mainly moths (Whitaker et al. 1977). Anecdotal information supports a diet largely of beetles and moths (Turner and Jones 1968, Arizona Game and Fish Department 1997). The loss of habitat through conversion and degradation is a major threat to this species. Second to loss of forested habitat is the loss of stand structural complexity, which supports both foraging and roosting activities. Disturbances of native vegetation can enhance the spread of invasive plant species, which may further disrupt insect diversity and densities. Other threats include recreational caving, rock climbing, commercial mining and quarrying of roost habitat. Pesticide use and environmental contaminants may reduce prey availability and bioaccumulate in bats. White-nose Syndrome (WNS) has recently arrived in the northwest. Given that many *Myotis* species have been severely impacted in the eastern United States, WNS could negatively affect fringed myotis as well. Threats to this species are enhanced by its patchy distribution and general low abundances.

Effects Analysis

No Action Alternative

Under the No Action alternative, fringed myotis roosting and foraging habitat would not be impacted. There are no hibernacula or mines in the analysis area. The No Action alternative would have approximately 125 more snags for roosting since this species roosts in snags larger than 11 inches DBH and none would be cut for the pipeline replacement.

Proposed Action Alternative

The Proposed Action would have no impact on maternity colonies or hibernacula since caves and mines are not in the project area. Some roost trees would be removed, including 125 snags larger than 11 inches DBH. Tree removal under the Proposed Action would benefit fringed myotis only slightly by opening the canopy along the pipeline which would improve foraging habitat. Large snags in the adjacent stands would continue to provide roosting habitat. Even though some roosting snags would be removed for pipeline construction, foraging habitat would be slightly improved and roosting habitat would still be provided adjacent to the pipeline, therefore the Proposed Action **may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.**

Cumulative Effects

Of the projects and activities found in Table 1 timber harvest on federal land (past, present, and reasonably foreseeable), and The Dalles Watershed Phase I and II Fuel Reduction were considered in this cumulative effects analysis because the activities overlap in time and space.

There are no known mines or caves that would provide for maternity colonies or hibernacula, therefore there are no cumulative effects to these structures. The Dalles Watershed Phase I and II would benefit the fringed myotis by increasing the potential for larger trees on the landscape and opening the canopy which provides foraging. Past timber harvest on federal land that targeted large ponderosa pine has reduced the number of large ponderosa pine which would become the large snags needed for roosting habitat.

Summary of Effects

Some roosting snags would be removed for pipeline construction, foraging habitat would be slightly improved and roosting habitat would still be provided adjacent to the pipeline, therefore the Proposed Action **may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.**

Additional information regarding this resource can be found in the full specialist report which is incorporated by reference and available in the project record.

Western Bumblebee

Existing Condition

Surveys for Western bumblebees were conducted by the Xerces Society on the Forest in 2013 and by Forest Service biologists in 2015. A total of 34 locations were surveyed in 2013 and Western bumble bees were located at 8 of these locations. In 2015, 24 locations were surveyed and bumble bees were detected at 8 locations, 6 of which were previously unreported locations for this species. In 2016, 23 locations were surveyed and Western bumblebees were documented at 6 of these sites. Five of the six sites were new locations for this species. One of the new locations found was in the meadow adjacent to Bear Springs Campground and previous detections were made adjacent to the project area at Little Crater Lake and Jackpot Meadow.

Effects Analysis

The analysis area for Western bumblebee includes the Dog River Pipeline Project boundary.

No Action Alternative

Under the No Action alternative, there would be no direct impacts to bumble bee nesting, foraging, and over-wintering habitat. There would be fewer flowering plants for foraging under this alternative in the long-term since canopies along the pipeline would remain unchanged and less sunlight would reach the forest floor which is required for the growth of most nectar plants.

Proposed Action Alternative

The proposed project may temporarily impact flowering plants during pipeline construction. Reducing this food source would reduce the ability of foraging bees to find nectar at these sites which is a required food source for young bees. It is expected that these shrubs would regenerate within a few years and that the bumblebees would have other nectar plants available adjacent to the proposed pipeline.

The proposed project may temporarily impact nest sites if these nests are located within abandoned bird nests or other structures above ground. Pipeline construction activities could reduce the number of nests

available in the short-term and therefore reduce the number of bumblebees that this area could support. Nest sites would increase within a few years after construction. The temporary reduction in flowering shrubs and nesting sites **may impact individuals, but will not likely contribute to a trend towards federal listing or cause a loss of viability of the population or species.**

The total number of acres impacted would not exceed 10.3 acres since that is the total area of the footprint of the pipeline. While the number of bees in the analysis area may be slightly reduced, this reduction would be temporary as flowering shrubs and nest sites increase within a few years after treatments.

Because bumblebees can forage for nectar on a variety of flowering plants, the area adjacent to the pipeline would continue to provide a food source. These portions of the watershed would also continue to provide for nesting and hibernating habitat. The adjacent untreated areas would allow for bumblebees to recolonize the impacted acres within the treatment area as foraging and nesting habitat return. Between 2 and 10 years after treatments, there would be an increase in flowering plants for foraging compared to the No Action alternative since the area along the pipeline would be more open and more sunlight would reach the forest floor which is required for the growth of most nectar plants.

Cumulative Effects

Of the projects and activities found in Table 1 timber harvest on federal land (past, present, and reasonably foreseeable), road decommissioning and road closures, trail construction and maintenance, pre-commercial thinning, and The Dalles Watershed Phase I and II Fuel Reduction were considered in this cumulative effects analysis because the activities overlap in time and space.

Projects that may increase or improve foraging habitat in the long-term include road closures, and pre-commercial thinning. While weed treatments may benefit bumblebees by improving habitat for native flowering plants, bees can be indirectly harmed when the flowers that they normally use for foraging are removed by the application of broad-spectrum herbicides. Depending on the prescription and the condition of the stand before treatments, timber harvest may increase or decrease the amount of foraging habitat available. Trail construction and maintenance reduces the amount of foraging and nesting habitat.

Habitat alterations including those that could destroy, fragment, alter, degrade or reduce the food supply produced by flowers as well as destruction of nest sites and hibernation sites for overwintering queens, such as abandoned rodent burrows and bird nests, adversely affect these bees. Large scale ground disturbing activities alter landscapes and habitat required by bumble bees by removing flowering food sources, disturbing nest sites and altering the vegetation community. The size of bumble bee populations diminish and inbreeding becomes more common as habitats become fragmented. This in turn, decreases the genetic diversity and increases the risk of population decline.

While the projects analyzed under cumulative effects may have impacts to individual bumble bees, the main threats to this species are agriculture and urban development, livestock grazing, and broad scale insecticide application (Thorpe et al. 2008). These kinds of activities are not included in the Proposed Action. Because some of the proposed activities increase or improve habitat while others may decrease it, the impacts would likely be beneficial and detrimental at the same time, and populations of this species would still persist in the analysis area.

Consistency Determination

The Proposed Action alternative is consistent with the following Standards and Guidelines for sensitive species: (1) FW-174: Threatened, endangered and sensitive plants and animals shall be identified and managed in accordance with the Endangered Species Act (1973), the Oregon Endangered Species Act (1987), and FSM 2670; and, (2) FW-175: habitat for threatened, endangered and sensitive plants and animals shall be protected or improved.

Summary of Effects

The temporary reduction in flowering shrubs and nesting sites may impact individuals, but will not likely contribute to a trend towards federal listing or cause a loss of viability of the population or species.

Additional information regarding this resource can be found in the full specialist report which is incorporated by reference and available in the project record.

Johnson's Hairstreak

Existing Condition

Johnson's hairstreak occurs within coniferous forests which contain the mistletoes of the genus *Arceuthobium*, commonly referred to as dwarf mistletoe. These plants are highly specialized and are known to occur on a number of different conifers (Schmitt and Spiegel 2008). Larsen et al. (1995) states that old-growth and late successional second growth forests provide the best habitat for this butterfly, although younger forests where dwarf mistletoe is present also supports *C. johnsoni* populations. All sightings in both Washington and Oregon have been in coniferous forests. Ecoregions where this species occurs in Oregon, as determined by the Oregon Biodiversity Information Center include the Ochoco, Blue and Wallowa Mountains, Coast Range, East Cascades, Klamath Mountains, West Cascades and the Willamette Valley. Larvae can be found feeding on dwarf mistletoe (Opler and Wright 1999). Caterpillars feed on all exposed plant parts and secrete a sugary solution which is used by ants that in turn protect the caterpillar from predators. Caterpillars can be found on host leaves April-October (Allen et al. 2005). Nectar of flowers in several families from numerous genera including *Actostophylos*, *Ceanothus*, *Cornus*, dandelion, *Fragaria*, *Rorippa* and *Spraguea* is consumed by adult butterflies who obtain additional moisture by visiting mud puddles (Shields 1965). Due to their habitat associations and tendency to reside in the forest canopy, these butterflies are not often encountered. The main threats to this species are the reduction of old-growth, insecticide use, and application of herbicides to flowering plants that are nectar sources.

Effects Analysis

Analysis Area

The analysis area for Johnson's hair streak includes the Dog River Pipeline project boundary.

No Action Alternative

Under the No Action alternative, there would be no direct impacts to Johnson's hair streak larval and foraging habitat. There would be fewer flowering plants for foraging under this alternative in the long-term since canopies would remain closed and less sunlight would reach the forest floor which is required for the growth of most nectar plants.

Proposed Action Alternative

The Proposed Action could impact the larval stage of Johnson's hairstreak by removing large trees with mistletoe. Mistletoe brooms may also be removed where it is a ladder fuel component. Trees with mistletoe would not be directly targeted by this project and would continue to be present throughout the planning area. Mature forest structure would also remain within treated and adjacent untreated stands.

The proposed project may temporarily impact flowering plants during road maintenance, road construction, fuels treatments, and timber harvest activities. Reducing this food source would reduce the ability of foraging butterflies to find nectar at these sites which. It is expected that these flowers and

shrubs would regenerate within a few years and that the butterflies would have other nectar plants available within the project area.

While the number of Johnson's hairstreak in the project area may be slightly reduced, this reduction would be temporary as flowering shrubs increase within a few years after treatments. Because these butterflies can forage for nectar on a variety of flowering plants, the untreated portions of the planning area would continue to provide a food source. These untreated portions of the planning area and many of the treated stands would continue to provide mistletoe for caterpillar habitat. The Proposed Action **may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.**

Cumulative Effects

Of the projects and activities found in Table 1 timber harvest on federal land (past, present, and reasonably foreseeable), pre-commercial thinning, road decommissioning and road closures, trail construction and maintenance, The Dalles Fuels Treatments Phase I and II, The Dalles Watershed Fuel Reduction, were considered in this cumulative effects analysis because the activities overlap in time and space.

Projects that may increase or improve foraging habitat in the long-term include plantation thinning, road closures, pre-commercial thinning, and noxious weed treatments. While weed treatments may benefit butterflies by improving habitat for native flowering plants, butterflies can be indirectly harmed when the flowers that they normally use for foraging are removed by the application of broad-spectrum herbicides.

Depending on the prescription and the condition of the stand before treatments, timber harvest may increase or decrease the amount of foraging habitat available. Trail maintenance removes flowering plants but at the same time maintains edges that promote the growth of flowering plants and shrubs.

Consistency Determination

The Proposed Action alternative is consistent with the following Standards and Guidelines for sensitive species: (1) FW-174: Threatened, endangered and sensitive plants and animals shall be identified and managed in accordance with the Endangered Species Act (1973), the Oregon Endangered Species Act (1987), and FSM 2670; and, (2) FW-175: habitat for threatened, endangered and sensitive plants and animals shall be protected or improved.

Summary of Effects

The Proposed Action **may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.** While the number of Johnson's hairstreak in the project area may be slightly reduced, this reduction would be temporary as flowering shrubs increase within a few years after treatments. These butterflies can forage for nectar on a variety of flowering plants, the untreated portions of the planning area would continue to provide a food source.

Additional information regarding this resource can be found in the full specialist report which is incorporated by reference and available in the project record.

3.6.4 Management Indicator Species – Deer, Elk, Pileated Woodpecker, American Marten, Wild Turkey, Western Gray Squirrel

Deer and Elk

Existing Condition

The project area supports elk and deer for most of the year. Elk cows and calves are in the western portion of the watershed from early spring through late fall. Black-tailed deer are common and relatively abundant in the spring, summer, and fall within the western portion of the planning area. The eastern portion of the planning area is identified in the Mt. Hood LRMP as inventoried winter range, most of which is in B10 Land Use Allocation. A number of deer and elk spend the winter there depending on snow accumulation. Deer are less likely to be there during periods of heavy snowfall as they are less able to move through deep snow. Forage is available in the planning area, but is generally of low quality due to the lack of un-forested areas. With the reduction in regeneration timber harvest, the Forest now has abundant optimal and thermal cover, but openings for forage are becoming scarce. There are approximately 69,226 acres of early-seral habitat on the Forest. This level is declining over time at mid and lower elevations since plantations have grown dense with trees that shade out forage. There are few dry meadows in the planning area, and forage habitat improvement for elk is limited.

High road densities lead to harassment of elk herds. Harassed elk move more often than elk left alone and use of habitat decreases as road density increases (Witmer 1985). It is also recognized that elk within or moving through areas of high open-road densities move longer distances; often several miles per day.

Effects Analysis

Analysis Area

The analysis area for deer and elk is the East Fork Hood River Watershed.

No Action Alternative

Disturbance from human presence and activities within the planning area would remain the same as the current levels.

Proposed Action Alternative

Pipeline construction activities could potentially disturb and temporarily displace animals in the area at the time of implementation. Project activities would not all be occurring at the same time, but in a few places at any one time. The potential disturbance is predicted to be small in scale, temporary in nature and only impact a few individuals. There would be no increase in the long-term harassment of deer and elk and the project is not expected to cause a measurable reduction or increase in the current local population size for either deer or elk.

Cumulative Effects

Of the projects and activities found in Table 1, timber harvest on federal land (past, present, and reasonably foreseeable), road decommissioning and road closures, pre-commercial thinning, The Dalles Watershed Phase I and II Fuel Reduction, and The Dalles Watershed Fuel Reduction were considered in this cumulative effects analysis because the activities overlap in time and space.

Cover is not considered a limiting factor for deer and elk in the analysis area because much of the Forest's lands are providing cover and very little forage opportunities. The optimum cover forage ratio is 60 percent forage and 40 percent cover (Thomas, 1979). Forage availability is more of a limiting factor on the Forest, but is more available off-Forest as a result of regeneration harvest on private lands. Cumulatively, there would be a small increase in forage and a small decrease in cover which would move the forage to cover ratio towards the optimum ratio.

An increase in human presence from developed and dispersed campsites would modify behaviors and may cause some avoidance behaviors by both deer and elk. Deer are expected to be more tolerant of recreation, while elk are less, and may move out of areas at certain times of the year. However, seasonal

closures on roads and trails are implemented in the areas for winter range, and for reasons of trail stability. Trails would impact deer and elk but are not anticipated to impact populations.

Consistency Determination

This analysis is consistent with The National Forest Management Act which requires the Forest Service to manage wildlife habitat to “maintain viable populations of existing native and desired non-native vertebrate species in the planning area.” The National Forest Management Act requires the Forest Service to identify Management Indicator Species through the planning process, and to establish objectives to maintain and improve the habitat of indicator species. A Forest wide analysis was completed and is incorporated by reference. Viable populations of all the Management Indicator Species in this BE would be maintained at the Forest-scale.

Open road densities under the Proposed Action would be reduced. However, the Forest Plan Standard of 2.5 miles per square mile of open roads for inventoried summer range (FW-208) would not be met. The Forest Plan Standard for open road densities within B10 and inventoried winter range would continue meeting the Forest Plan Standard of 1.5 (B10) and 2.0 (inventoried winter range) miles per square mile.

Summary of Effects

An increase in human presence from developed and dispersed campsites would modify behaviors and may cause some avoidance behaviors by both deer and elk. However, seasonal closures on roads and trails are implemented in the areas for winter range, and for reasons of trail stability. Trails would impact deer and elk but are not anticipated to impact populations.

Pileated Woodpecker

Existing Condition

The pileated woodpecker was chosen as a management indicator species because of its need for large snags, large amounts of down woody material, and large defective trees for nesting, roosting and foraging. Large snags and decadent trees are important habitat components for pileated woodpeckers (Hartwig et al. 2004, Mellen et al. 1992). The association with late seral stages comes from the need for large-diameter snags or living trees with decay for nest and roost sites, large-diameter trees and logs for foraging on ants and other arthropods, and a dense canopy to provide cover from predators. Because ants are the main diet for pileated woodpeckers, large diameter snags and logs with some decay are selected for foraging because carpenter ants inhabit these sites. Given the amount of habitat available, there may be up to 10 home ranges in the project area when considering unmanaged stands as habitat.

Effects Analysis

Analysis Area

The analysis area for the pileated woodpecker includes the area within the project boundary. The Northwest Forest Plan directs the B5 pileated woodpecker/American marten areas to return to their underlying land allocation in Matrix lands except where needed to assure habitat and dispersal for the guilds of species represented by the pileated woodpecker and marten. The Forest assessed the relative importance of individual B5 areas in contributing to late seral forest conditions at the watershed landscape level. Based on that assessment, the Forest recommended that certain B5 areas be returned to the underlying land allocation and that individual watershed analysis take a closer look at the remaining B5 areas. There is no B5 in the Analysis Area.

No Action Alternative

There would be no short-term effects to pileated woodpecker habitat under this alternative. In the short-term, large trees and snag levels would remain essentially unchanged. In 20 to 30 years, more snags are likely to be added along the pipeline.

Proposed Action Alternative

Pipeline construction would impact habitat by removing large trees and snags which would reduce the amount of nesting and foraging trees available for up to one pair of pileated woodpeckers. This impact would be long-term since trees would not be allowed to grow back along the pipeline.

Cumulative Effects

Of the projects and activities found in Table 1, timber harvest on federal land (past, present, and reasonably foreseeable), and The Dalles Watershed Phase I and II Fuel Reduction were considered in this cumulative effects analysis because the activities overlap in time and space. Past timber harvest on federal lands has reduced the amount of habitat in the analysis area. Habitat for this species has continued to increase over time across the Forest but the analysis area would likely provide less habitat than other areas of the Forest due to past and present timber harvest.

Consistency Determination

This analysis is consistent with The National Forest Management Act which requires the Forest Service to manage wildlife habitat to “maintain viable populations of existing native and desired non-native vertebrate species in the planning area.” The National Forest Management Act requires the Forest Service to identify Management Indicator Species through the planning process, and to establish objectives to maintain and improve the habitat of indicator species. A Forest wide analysis was completed and is incorporated by reference. Viable populations of all the Management Indicator Species in this BE would be maintained at the Forest-scale.

Summary of Effects

Pipeline construction would impact habitat by removing large trees and snags which would reduce the amount of nesting and foraging trees available for up to one pair of pileated woodpeckers. This impact would be long-term since trees would not be allowed to grow back along the pipeline.

Additional information regarding this resource can be found in the full specialist report which is incorporated by reference and available in the project record.

American Marten

Existing Condition

In the western United States, the American marten’s distribution is fragmented. Home ranges vary from 1 to 4.5 square miles for males and from 0.4 to 3.6 square miles for females (Simon 1980, Zielinski et al. 1997). Martens prey on vertebrates smaller and larger than themselves, eat carrion, and forage for bird eggs, insects, and fruits (Martin 1994). American martens are closely associated with forested habitats with complex physical structure near the ground. Use of non-forested habitats by martens increases in summer and includes meadows and small harvest units near forest edges, as well as areas above the tree line in western mountains (Buskirk and Ruggiero 1994). Activities such as timber harvest and road construction that fragment, dissect, and isolate habitats are the largest threats to marten. Fragmented habitats attract habitat generalist predators like the great-horned owl, coyote, and bobcat which can all prey on marten. In addition, fragmentation eliminates the connectivity and creates isolated individuals and populations which are more susceptible to extirpation.

Effects Analysis

Analysis Area

The analysis area for the American marten includes the area within the project boundary. The Northwest Forest Plan directs the B5 pileated woodpecker/American marten areas to return to their underlying land allocation in Matrix lands except where needed to assure habitat and dispersal for the guilds of species represented by the pileated woodpecker and marten. The Forest assessed the relative importance of individual B5 areas in contributing to late seral forest conditions at the watershed landscape level. Based on that assessment, the Forest recommended that certain B5 areas be returned to the underlying land allocation and that individual watershed analysis take a closer look at the remaining B5 areas. There is no B5 in the Analysis Area.

No Action Alternative

There would be no short-term effects to American marten under this alternative. In the short-term, habitat and snag levels would remain essentially unchanged. In 20 to 30 years, more snags are likely to be added along the pipeline.

Proposed Action Alternative

Pipeline construction would impact marten habitat by removing large trees and snags which would reduce the amount of denning and foraging trees available. This impact would be long-term since trees would not be allowed to grow back along the pipeline.

Cumulative Effects

Of the projects and activities found in Table 1, timber harvest on federal land (past, present, and reasonably foreseeable), and The Dalles Watershed Phase I and II Fuel Reduction were considered in this cumulative effects analysis because the activities overlap in time and space.

Past timber harvest on federal lands has reduced the amount of habitat in the analysis area. Habitat for this species has continued to increase over time across the Forest but the analysis area would likely provide less habitat than other areas of the Forest due to past and present timber harvest.

Consistency Determination

This analysis is consistent with The National Forest Management Act which requires the Forest Service to manage wildlife habitat to “maintain viable populations of existing native and desired non-native vertebrate species in the planning area.” The National Forest Management Act requires the Forest Service to identify Management Indicator Species through the planning process, and to establish objectives to maintain and improve the habitat of indicator species. A Forest wide analysis was completed and is incorporated by reference. Viable populations of all the Management Indicator Species in this BE would be maintained at the Forest-scale.

The Forest wide Standards and Guidelines would be met for B5 American marten land allocation. At least 160 acres of mature and/or old growth forest habitat shall be maintained within each 320 acre Management Area for American marten (B5-010). Snags are discussed below under “Snag and Down Log Associated Species.”

Summary of Effects

Pipeline construction would impact marten habitat by removing large trees and snags which would reduce the amount of denning and foraging trees available. This impact would be long-term since trees would not be allowed to grow back along the pipeline.

Additional information regarding this resource can be found in the full specialist report which is incorporated by reference and available in the project record.

Wild Turkey and Gray Squirrel

Existing Condition

Wild Turkey

The wild turkey is a management indicator species for the ponderosa pine-Oregon white oak vegetation association of the Forest. Two subspecies of wild turkeys (Merriam's and Rio Grande) are found on the Forest. Turkeys feed on acorns, conifer seed, insects, and grass/forbs and nest on the ground hidden by grass or shrubs. Turkeys roost on the ground and in large diameter (> 14 inch dbh) ponderosa pine and Douglas-fir generally on slopes greater than 30 percent and within 0.5 miles of a food source.

Western Gray Squirrel

The western gray squirrel is also a management indicator species for the ponderosa pine-Oregon white oak association of the Forest. Western gray squirrels need a mix of mast-producing trees to provide food, cover, and nesting sites in their habitat. The ecological range of the western gray squirrel includes a variety of habitat types within mixed conifer and oak forests. High tree species diversity is a common component of western gray squirrel habitat and contributes to habitat quality (Linders, 2000). Gray squirrel have been documented in the planning area and there is both wintering and nesting habitat.

Effects Analysis

Analysis Area

The analysis area for wild turkey and Western gray squirrels includes the area that lies within the project boundary.

No Action Alternative

Under the No Action alternative, there would be no change to forage and hiding cover for wild turkey. Western gray squirrel would continue to have an abundance of nesting habitat and mycorrhizal fungi for foraging.

Proposed Action Alternative

The Proposed Action would have little impact to wild turkey since the pipeline construction would minimally open stands and provide some suitable foraging, nesting, brood-rearing, and roosting cover. Pipeline construction would open the forest canopy in places and provide a combination of open, mature, mast-producing forests and shrubs, and species of varying ages and sizes that would create a mix of habitats. Because the pipeline is so narrow, this increase would be minimal. The stands adjacent to the pipeline would maintain patches of forested habitat that would serve as travel corridors.

The Proposed Action would have both negative and beneficial impacts to western gray squirrels. Reduction of canopy cover and disturbance of the litter layer during construction may reduce soil moisture resulting in lower mycorrhizal fungi production, which is an important food source for this species. Western gray squirrels would continue to forage in the stands adjacent to the pipeline and would also nest in adjacent conifer stands with higher canopy cover. The Proposed Action would not be expected to reduce the number of Western gray squirrels that the planning area could support because tree removal for the pipeline adjacent to uncut stands would continue to provide conditions suitable for both foraging and nesting.

Cumulative Effects

Of the projects and activities found in Table 1, timber harvest on federal land (past, present, and reasonably foreseeable), and The Dalles Watershed Phase I and II Fuel Reduction were considered in this cumulative effects analysis because the activities overlap in time and space. These projects would have a combination of beneficial and negative impacts to wild turkey and western gray squirrel. Timber harvest and thinning have reduced the canopy cover which reduces nesting habitat for western gray squirrel but may also increase pine seed production for foraging.

Consistency Determination

This analysis is consistent with The National Forest Management Act which requires the Forest Service to manage wildlife habitat to “maintain viable populations of existing native and desired non-native vertebrate species in the planning area.” The National Forest Management Act requires the Forest Service to identify Management Indicator Species through the planning process, and to establish objectives to maintain and improve the habitat of indicator species. A Forest wide analysis was completed and is incorporated by reference. Viable populations of all the Management Indicator Species in this BE would be maintained at the Forest-scale.

Summary of Effects

The Proposed Action would have little impact to wild turkey since the pipeline construction would minimally open stands and provide some suitable foraging, nesting, brood-rearing, and roosting cover. The Proposed Action would not be expected to reduce the number of Western gray squirrels that the planning area could support because tree removal for the pipeline adjacent to uncut stands would continue to provide conditions suitable for both foraging and nesting.

Additional information regarding this resource can be found in the full specialist report which is incorporated by reference and available in the project record.

3.6.5 Snag and Down Log Associated Species

Existing Condition

Snags

Currently, 63.3 percent of the East Fork Hood River Watershed contains no large snags in eastside mixed conifer compared to the historic condition of 34.6 percent. The only category where current levels exceed historical conditions is in 0-2 large snags per acre. Currently, 16.7 percent of the watershed has between 0 and 2 snags per acre and historically that number was 14.2. This Watershed is deficient in high concentrations of snags with 8.1 percent of the area with 10 or more snags per acre historically and 3.9 percent currently.

Down Wood

While current and reference conditions of large down logs in eastside mixed conifer are comparable, there are some differences. Historically, 14.0 percent of the White River Watershed had 2 to 4 percent cover of large down logs compared to 6.8 percent currently. Under historic conditions, none of the watershed had greater than 12 percent cover and currently 6.9 percent of the watershed has greater than 12 percent cover.

Effects Analysis

The analysis area includes the White River Watershed. The Pipeline falls within the habitat type identified in DecAID as Eastside Mixed Conifer with vegetation condition types of small/medium trees and large trees.

No Action Alternative

In the short-term, portions of the pipeline that go through plantations would provide low amounts of down wood cover. Most areas would be below 6.5 percent cover of down wood and therefore be below the 30 percent tolerance level for wildlife habitat. However, some of the pipeline would likely have at least 3 percent of down wood comprised of classes 1 thru 4 and therefore would meet the 30 percent tolerance level for natural down wood conditions, as indicated by DecAID inventory data from unharvested plots.

In the next 20 to 30 years, these stands would begin to experience increased stand density and start to become increasingly more susceptible to damaging agents such as insects and diseases. These natural processes would recruit new snags and down logs, mainly from the smaller intermediate and suppressed trees.

Proposed Action Alternative

The proposed action would involve the removal of trees and dead wood within a 25-foot corridor. Approximately 438 live trees ranging in size from 6" to 48" dbh that will be removed. Of these 438 trees, roughly 12 are larger than 24" dbh, 170 are between 12" and 14" inches, and the remaining trees are 11" and smaller. In addition to the live trees approximately 198 standing dead trees would be cut. Of these, over half are between 11" and 20" inches, roughly 3 are over 30" dbh, 22 between 20" to 30", with the remainder under 11" dbh. Some of the live trees proposed for cutting would have eventually become snags and down wood. The total acre of trees and snags proposed for cutting is 10.3 acres. The Watershed is 102,016 acres and the proposed acres removed represents 0.01. Assuming that 20 percent of the live trees would eventually become snags in the next 50 years, the potential amount of snags lost from the proposed pipeline would not exceed 0.005 percent of the Watershed which is not measurable at a meaningful scale and the comparison of reference and current conditions for down logs and snags would remain unchanged. The project design criteria that requires 5 percent of the largest trees to be left on site, increasing the amount of large down wood in the planning area.

Cumulative Effects

Of the projects and activities found in Table 1, timber harvest on federal land (past, present, and reasonably foreseeable), road decommissioning and road closures, and trail maintenance and relocation were considered in this cumulative effects analysis because the activities overlap in time and space.

It is not likely that private lands would provide snags and downed wood in the foreseeable future. Other timber harvest activities on Forest Service land would improve structural diversity by initiating a new age class and by creating openings. Thinning would also have an indirect impact by releasing the green retention trees. These retention trees would later become the large diameter snags and downed wood. Blocks of unharvested habitat would provide large snags and down wood while the treated areas of the watershed move toward the mature forest state. The adjacent untreated areas would allow for snag and down wood-dependent species to recolonize habitat as snags and down wood increase in the treated areas.

Consistency Determination

FW-219 and FW-223 indicate that stands should have 6 logs per acre in decomposition class 1, 2, and 3 and that they should be at least 20 inches in diameter and greater than 20 feet in length. However, FW-225 and FW-226 indicate that smaller size logs may be retained if the stand is too young to have 20 inch trees. Under the Proposed Action, logs representing the largest tree diameter class would be retained, maintaining compliance.

Summary of Effects

The proposed acres removed represents 0.01 percent of the East Fork Hood River Watershed which is 102,016 acres. Assuming that 20 percent of the live trees would eventually become snags in the next 50 years, the potential amount of snags lost from the proposed pipeline would not exceed 0.005 percent of the Watershed which is not measurable at a meaningful scale.

Additional information regarding this resource can be found in the full specialist report which is incorporated by reference and available in the project record.

3.6.6 Neotropical Migratory Birds

Existing Condition

Close to 30 species of migratory birds occur on the Barlow and Hood River Districts, some of which are present within the project area during the breeding season. Some species favor habitat with late-successional characteristics, such as the hermit thrush and brown creeper, while others favor early-successional habitat such as the Nashville warbler or the Williamson's sapsucker. Other species like the white headed woodpecker and pygmy nuthatch utilize open ponderosa pine habitat. Sandhill crane nest in Camas Prairie in the open meadow when it is flooded in the spring and early summer.

Effects Analysis

The analysis area for migratory birds includes areas within the boundary of the Proposed Action.

No Action Alternative

There would be no habitat alteration under this alternative. Stand conditions and the composition of migratory bird species dependent on these stands would remain unchanged.

Proposed Action Alternative

Research has demonstrated that timber removal enhances habitat for a number of migratory species and provides habitat for some species that are rare or absent in un-thinned stands (Hagar and Friesen 2009). However, some species of migratory birds have been shown to decline following thinning. The effects of tree removal would most likely have a combination of positive, neutral, and negative impacts on migratory bird use depending on which species are present. The species that may benefit from tree removal in the analysis area include the olive-sided flycatcher, Williamson's sapsucker, and chipping sparrow. The species that may be negatively impacted by tree removal include the brown creeper, Swainson's thrush, and hermit warbler. Because the trees to be removed are in a linear pattern along the pipeline, the effects to migratory bird species would be difficult to measure since the habitat at the stand scale would remain unchanged.

Cumulative Effects

Of the projects and activities found in Table 1, timber harvest on federal land (past, present, and reasonably foreseeable), road decommissioning and road closures, The Dalles Watershed Phase I and II Fuel Reduction, and The Dalles Watershed fuel reduction were considered in this cumulative effects analysis because the activities overlap in time and space.

Open habitat that would be created could be beneficial for early seral species like the olive-sided flycatcher, white-headed woodpecker and Williamson's sapsucker. The Swainson's thrush and brown creeper would be negatively impacted by habitat removal. The cumulative effects of timber harvest activities are similar to the effects of the Proposed Action and would have a combination of positive, neutral, and negative impacts on migratory birds.

Consistency Determination

The Proposed Action is consistent with Executive Order 13186 (66 Fed. Reg. 3853, January 17, 2001) “Responsibilities of Federal Agencies to Protect Migratory Birds.” This Executive Order directs federal agencies to avoid or minimize the negative impact of their actions on migratory birds, and to take active steps to protect birds and their habitat. This Executive Order also requires federal agencies to develop Memorandum of Understandings (MOU) with the FWS to conserve birds including taking steps to restore and enhance habitat, prevent or abate pollution affecting birds, and incorporating migratory bird conservation into agency planning processes whenever possible. The Bureau of Land Management and U.S. Forest Service have both completed, and are currently implementing, their respective MOU’s with the FWS.

Summary of Effects

The effects of tree removal would most likely have a combination of positive, neutral, and negative impacts on migratory bird use depending on which species are present. Because the trees to be removed are in a linear pattern along the pipeline, the effects to migratory bird species would be difficult to measure since the habitat at the stand scale would remain unchanged.

Additional information regarding this resource can be found in the full specialist report which is incorporated by reference and available in the project record.

3.7 Botany

3.7.1 Existing Condition

This project is located in an area which has been managed in the past. Some large legacy trees remain, but it is predominantly second-growth Douglas-fir, with a shrub component of oceanspray (*Holodiscus discolor*) and wild rose (*Rosa gymnocarpa*) among others. There is a healthy diversity of understory forbs and grasses within this area, especially within forest openings. The trees and shrubs have been thinned along the road systems to maintain a fuel break, and now support a dense grass and forb community. Along the pipeline itself there are several small, wetland habitats. These have been determined to be naturally created sites (see the Fisheries report for more information) which could provide potential habitat for certain bryophyte species. Only one species was known from within this project area, and no new sites were found during project surveys.

Shistostega pennata

The goblin-moss, *Shistostega pennata*, is listed as a Class A species on the 2001 ROD. It used to be on the Regional Forester's Sensitive species list, but has been removed and does not have a state ranking with the Oregon Natural Heritage Program. There is one historic site for the goblin-moss within Brook's Meadow creek near the project area. There is one point along this creek where the pipeline and access will cross. Surveys at this site did not find any specimens. The goblin-moss is an ephemeral species which often colonizes mineral soil, most often within the root mass of recently downed trees. These sites are most common in moist areas, or sites such as caves or riparian areas which stay moist. As this bare, mineral soil becomes colonized by other bryophytes and plants after the first year, the goblin-moss will fade out (Harpel and Helliwell 2005).

3.7.2 Effects Analysis

No Action Alternative

Under the No Action alternative, no activities involving the pipe replacement, and all associated ground-disturbance, repair and maintenance would occur. There would be no impact to sensitive vascular plants, bryophytes, lichens and fungi.

Proposed Action Alternative

The Proposed Action includes ground-disturbing activities associated with removing the old, existing pipe and replacing it and other infrastructure. There is also planned, regular maintenance along this pipeline. This work will remove existing vegetation and create early seral habitats along the pipeline.

There are no current sites for sensitive vascular plants, bryophytes, lichens and fungi within this project area, so there will be no impact to any of these species.

Cumulative Effects

There are no sensitive species known from this area, resulting in no cumulative effects to consider within this report.

3.7.3 Consistency Determination

Forest Service Policy

The No Action alternative and the Proposed Action alternative are consistent with the following Forest Service Standards FSM 2672.1 - Sensitive Species Management and FSM 2670.22(2) - “Maintain viable populations of all native and desired non-native wildlife, fish and plant species in habitats distributed throughout their geographic range on National Forest System lands.”

Mt. Hood National Forest Land and Resource Management Plan (Forest Plan) Direction

The No Action alternative and the Proposed Action alternative are consistent with the following Forestwide Standards; FW-148, 149 and 150, FW-162, FW-174, FW-175 – “Habitat for threatened, endangered, and sensitive plants and animals shall be protected and/or improved, and FW-176.

2001 Survey and Manage Record of Decision

The No Action alternative and the Proposed Action alternative are consistent with the survey protocols 2001 Survey and Manage Record of Decision. All botany surveys included consideration of botanical species in Table C-3 of the 2001 Survey and Manage Record of Decision.

National Forest Management Act (NFMA) Implementing Regulations

The No Action alternative and the Proposed Action alternative are consistent with regulations 36 CFR 219.19 and The 1983 USDA Departmental Regulation 9500-4.

3.7.4 Summary of Effects

The Proposed Action would have no impact on sensitive vascular plants, bryophytes, lichens and fungi because there are no sensitive vascular plants, bryophytes, lichens and fungi within this project area.

Additional information regarding this resource can be found in the full specialist report which is incorporated by reference and available in the project record.

3.8 Invasive Plant Species

3.8.1 Existing Condition

The project area is located within a previously managed area. The area has a healthy growth of native shrubs, grasses and forbs which prevents the establishment of invasive species. The 1700 road is maintained as a fuel break, and is also heavily utilized for travel and recreation. This route has been used many times in the past several years as a haul route for timber sales. Because of these activities, this road and nearby landings or trailheads have been regularly surveyed and managed for invasive weeds for many years. The 1700-014 road runs parallel to the existing pipeline, and is used primarily for pipeline maintenance and not for regular travel. The target invasive species, or “noxious weeds” identified by the Oregon Department of Agriculture (ODA) that are known to occur within or adjacent to the project area are spotted and diffuse knapweed, bull thistle and St. Johnswort. There are only sparse populations of each within the project area.

3.8.2 Effects Analysis

No Action Alternative

The No Action alternative would have no effects which would increase or introduce invasive weed populations. None of the planned activities would take place, and no ground disturbance would occur.

Vectors which are currently present would continue to have the potential for invasive species introduction and spread.

Proposed Action Alternative

The Proposed Action would remove old pipeline, replace it and other infrastructure, and would provide maintenance along this new line. These ground-disturbing activities would create favorable conditions for invasive species establishment from new or current populations and seed source. As part of the project, pipes and gravel/sand materials will be stockpiled at four different sites off the 1700 road and 4400-011 road. These stockpiles will be in open, previously disturbed areas which have been approved for use. Introduction of new weed species or infestations can occur through this material and its use during the project implementation. Machinery also has the potential to bring in new weed seeds or particles, or transport it from neighboring infestations.

Project Design Criteria associated with the Proposed Action would provide mitigation for the introduction of new weed species, and would prevent the spread of current invasive species into areas without infestation as well as to other areas of the forest. This prevention would occur through the cleaning of equipment, use of weed-free materials, and restoration with native seed. Machinery would be washed prior to its arrival on forest land. There are only small infestations near the project area, but those haul routes, landings and known sites within the project area would be treated prior to implementation.

The level of risk for the introduction or spread of noxious weeds is moderate and based on the following: known weeds in/and or adjacent (~ 100 feet) to the project area, in moderate quantities (Moderate density/acre), no more than four of vectors 1 - 8 present in the immediate project area, project operation activities not able to avoid weed populations.

Long term treatments are not proposed as part of this project, and would be conducted under a separate program and NEPA document (FEIS Site-Specific Invasive Plant Treatments for Mt. Hood National Forest and Columbia River National Scenic Area in Oregon including Forest Plan Amendment #16).

Cumulative Effects

The area analyzed for cumulative effects was within the Dog River 6th field subwatershed, with a focus on the travel ways within and associated with the project. Of the projects and activities found in Table 1, road decommissioning and road closures, The Dalles Watershed Phase I and II Fuel Reduction, The Dalles Watershed fuel reduction, trail maintenance and relocation, were considered in this cumulative effects analysis because the activities overlap in time and space.

These projects overlap in space and some overlap in time. The use of the 1700 road system and nearby trails for project haul routes and travel has a continued risk for invasive species introduction. Project Design Criteria, as discussed above, would mitigate for the introduction and spread of invasive species. Under the 2008 Site-Specific Invasive Plant Treatment EIS, roadside populations would be treated regularly depending on the need and level of infestation. These combined actions would lower the risk of invasive species introduction within the project area. This additional road maintenance would be addressed separately through the FEIS Site-Specific Invasive Plant Treatments for Mt. Hood National Forest and Columbia River National Scenic Area in Oregon including Forest Plan Amendment #16.

3.8.3 Consistency Determination

Forest Service Manual (FSM) 2900 Invasive Species Management direction requires the determination of “the risk of invasive species introduction or spread as part of the project planning and analysis process for proposed actions, especially for ground disturbing and site altering activities, and public use activities” (FSM 2904.08, #8)

FSM 2900 also states, “Ensure that all Forest Service management activities are designed to minimize or eliminate the possibility of establishment or spread of invasive species on the National Forest System, or to adjacent areas” (FSM 2903).

The identification of management and prevention is also consistent with the Site-Specific Invasive Plant Treatments for Mt. Hood National Forest and Columbia River Gorge National Scenic Area in Oregon FEIS/ROD (2008).

Northwest Forest Plan Direction:

- FW-299 - “Noxious weed control projects shall comply with Region Six “Managing Competing and Unwanted Vegetation” FEIS, Record of Decision (1988), and Mediated Agreement (1989).”
- FW-300 - “Plants that have been identified as pests by the State Department of Agriculture shall be controlled as described in the Mt. Hood National Forest Noxious Weed Implementation Plan.”
- FW-301 - “Implementation of control measures should adhere to the following priorities:
 - Prevention
 - Early treatment
 - Maintenance
 - Correction
 - No action (per Vegetation Management FEIS, Record of Decision 1988, and Mediated Agreement 1989)”
 - B2-056 – “Vegetation management adjacent to major travel routes or recreation sites shall be consistent with the Northwest Region (R6) “Management of Competing and Unwanted Vegetation” FEIS, Record of Decision (1988) and Mediated Agreement (1989)”

3.8.4 Summary of Effects

The Proposed Action would have a moderate risk of weed introduction. The pipe removal and replacement activities would create disturbed conditions for invasive species growth, and the equipment may introduce seeds or propagules from nearby roadside sources. Mitigations are proposed to reduce the risk of invasive species introduction and spread.

Additional information regarding this resource can be found in the full specialist report which is incorporated by reference and available in the project record.

3.9 Recreation

3.9.1 Existing Condition

Recreational activities occur within and adjacent to the project area. The area is popular for dispersed recreation, including hunting and camping. A popular non-motorized trail system is located along The Dog River Pipeline as well as in the adjacent area. The following existing conditions within the planning area will be examined: the Recreation Opportunity Spectrum, dispersed recreation, and trails.

Recreation Opportunity Spectrum (ROS)

The majority of the proposed project falls within the ROS setting identified in the Forest Plan as: Roaded Modified. Recreation experiences and opportunities in these areas often depend on vehicular access off the primary routes via secondary roads. Camping experiences are relatively primitive, with few on-site facilities provided, requiring some self-reliance and use of primitive outdoor skills.

A small portion of the project falls within the Roaded Natural ROS setting. This portion of the project is not a high use recreation area. Roaded National ROS settings provide for areas characterized by predominantly natural-appearing environments with moderate evidences of the sights and sounds of man. These evidences usually harmonize with the natural environment. Interaction between users may be low to moderate but with evidence of other users prevalent. Resource modification practices are evident but harmonize with the natural environment. Conventional motorized use is provided for in construction standards and the design of facilities.

Dispersed Recreation

Dispersed recreation use may occur throughout the project area. Dispersed recreation in the vicinity of the proposed pipeline replacement may include camping, hunting, berry picking, mushroom picking, and driving for pleasure. Other incidental recreational use may occur as well.

Trails

There are numerous popular trails along Forest Roads 44 and 17. Surveyors Ridge Trail 688 is popular for hikers and mountain bikers. The trail winds through forested areas, open areas and along Surveyors Ridge where it provides views of Mt. Hood and the surrounding valley. The trail is located on top of the Dog River Pipeline for approximately 2.7 miles. This section of the trail is also an access road, but portions of it have grown in significantly over the years making it look more like a trail than a road.

Surveyors Ridge Trail 688 connects with other popular trails in the area which provide large loops for nonnotarized recreationists to connect. Surveyors Ridge Connects directly to The Super Connector, Dog River Trail 675 and Cooks Meadows Trail 639. Many mountain bikers enjoy riding several trails in one day, and Surveyors Ridge is often a popular choice for both locals and visitors who have heard about the views the trail offers.

Forest Roads 44 and 17 are snowmobile trails during the winter. The roads are closed November 15 through March 15 and may be groomed for snowmobiles December 1 through April 1. A local snowmobile club performs the grooming under a road use permit with the Mt. Hood National Forest.

Table 13. Trails within Project Area

Trail Name and Number	Permitted Use	Approximate Length (Miles)
Surveyors Ridge 688	Pack and Saddle, Bike, Hike	13.0
Dog River 675	Bike, Hike	5.3
Cooks Meadow 639	Pack and Saddle, Bike, Hike	3.0

3.9.2 Effects Analysis

No Action Alternative

There would be no direct or indirect effects from the No Action alternative. Taking the No Action alternative would have no impact to the ROS spectrum, dispersed recreation, or trails.

Proposed Action Alternative

Recreation Opportunity Spectrum (ROS)

The pipeline replacement would not have a detrimental impact on the Roaded Modified ROS or Roaded Natural ROS. In both ROS settings motorized use is evident. Project completion could bring more routine maintenance utilizing vehicles along the pipeline right-of-way. This activity would be consistent with these ROS settings, as well as the presence of a modern, roaded right-of-way.

Dispersed Recreation

The proposed project could have some impacts to dispersed recreation. During project implementation, forest visitors could see and hear construction along the pipeline right-of-way and the proposed staging areas. This impact would be temporary and only occur during project implementation.

Another effect would be the presence of a modern right-of-way with the completion of the project. The new right-of-way would look different from the existing right-of-way and have substantially less vegetation shading it. Some visitors may enjoy the new right-of-way, and use it for non-motorized recreation. Others may miss the old right-of-way which was not visible from the roadway and was well shaded and had vegetation encroaching upon in in areas.

Visitors who enjoy driving for pleasure would see the right-of-way corridor where it crosses Forest Road 17. The right-of-way would be the most visible from the west side of the road. Some visitors may not appreciate the change in scenery from the road, although it will impact the view for less than 100 linear feet along the road.

Trails

Sections of the Surveyors Ridge Trail 688 would be closed during implementation. A 2.7 mile section of the trail overlaps with the existing right-of-way. This section of trail would be substantially different once the pipeline is replaced as the right-of-way which is currently covered with native surface and shaded by vegetation would be disturbed to replace the existing pipeline and resurfaced with aggregate and widened to 25 feet. To mitigate this impact, a trail has been constructed connecting the Super Connector trail directly to Surveyors Ridge Trail 688. This action will allow visitors to use the Super Connector Trail to directly access the Surveyors Ridge Trail and bypass the section of trail where the pipeline replacement would take place. A reroute would also be completed to allow visitors to stay on a primitive trail and avoid the sections of existing trail where it would be impacted by the pipeline project, except at one intersection.

Some visitors might prefer using pipeline right-of-way once it becomes a modern right-of-way. They might enjoy easy access along the corridor. Others may be disappointed that what they perceived to be a trail and not a right-of-way looks and feels more like a road. There would likely be a period during construction when there wouldn't be trail access to the unimpacted section of Surveyors Ridge trail from the Dog River and Cooks Meadow trails. Some visitors may not utilize the trail system for this reason. However, this would be temporary. All changes to the system would be posted at pertinent trail heads, on pertinent websites and released to the public ahead of time, so visitors could plan accordingly.

It is unlikely that the Dog River Pipeline replacement would have an impact on groomed snowmobile trails in the vicinity of the project.

Cumulative Effects

Of the projects and activities found in Table 1, the items below were considered when analyzing cumulative effects for recreation. These items were analyzed as a result of their proximity to the planning area and their potential to have an effect on recreation within the planning area. The spatial context of the cumulative effects analysis lies within one mile of any portion of the proposed pipeline replacement. Under the Proposed Action, these items could have an impact on the planning area. Combined with the Proposed Action, these actions would not deviate from Forest Plan standards.

Trail Maintenance

No cumulative effects would occur. The affected portion of Surveyors Ridge Trail would be closed and the portion of the trail overlapping the pipeline right-of-way would be permanently impacted, but project design criteria would mitigate any long term impacts after the project was complete by rerouting the trail to provide a similar, somewhat primitive trail experience. Over time, potential hazard tree removal along trails could open up scenic views near the project area. This could improve views of Mount Hood as well as other unique natural features within the planning area.

Hazardous Fuels Reduction

No cumulative effects would occur. The projects would occur in close proximity, and trail closures would occur due to each project. However, they would not be likely to be implemented at the same time. Furthermore, the Surveyors Ridge Trail reroute would help mitigate impacts of closure of the Dog River Trail which would occur during the implementation of the fuels reduction.

Road decommissioning and road closures

No cumulative effects would occur. Road closures within and adjacent to the project could eliminate access to dispersed campsites and other dispersed recreation use like berry picking. There are already a minimal number of roads in the vicinity. Any closures would be minimal and would have a small impact on access for dispersed recreation. Over time, potential hazard tree removal along roads could open up scenic views near the project area. This could improve views of Mount Hood as well as other unique natural features within the planning area.

3.9.3 Consistency Determination

Table 14 lists the Standards and Guidelines from the Forest Plan pertinent to the No Action alternative and the Proposed Action alternative.

Table 14. Consistency with Forest Plan Standards and Guidelines

Standards & Guidelines	Relevant Element of Proposed Action	Does the Proposed Action Meet Standard as currently designed?	Data Used for Analysis
FW-451/458: Forest Management activities with the potential to adversely impact trails and associated facilities and dispersed recreation sites shall include measures to minimize impacts and provide for protection and/or restoration of the impacted trails, sites, facilities, and structures.	Installation of a modern pipeline and modern right-of-way in the same location as the Surveyors Ridge trail.	Yes	Surveyors Ridge Trail Reroute Decision Memo.
FW-460: Trail systems shall be designed, located, managed, and maintained to consider user's needs and other resource objectives	Installation of a modern pipeline and modern right-of-way in the same	Yes	Surveyors Ridge Trail Reroute Decision Memo.

Standards & Guidelines	Relevant Element of Proposed Action	Does the Proposed Action Meet Standard as currently designed?	Data Used for Analysis
	location as the Surveyors Ridge trail.		
FW-452/463: Designated trails, trailheads, associated facilities, and dispersed recreation sites impacted and/or adversely affected by management activities, shall be rehabilitated, restored, and/or relocated.	Installation of a modern pipeline and modern right-of-way in the same location as the Surveyors Ridge trail, and closure of portions of the trail system.	Yes	Surveyors Ridge Trail Reroute Decision Memo.
B2-001: Structures and improvements may be provided to protect resource values, for administrative purposes, and to accommodate recreational use	Pipeline installation is needed for administrative purposes for The City Of The Dalles	Yes	Proposed Action discusses need for improving the existing pipeline.
B2-005: A trail system should be developed and designated to disperse recreational use and provide a range of difficulty levels.	Pipeline will have an impact on trail system. Separate decision will mitigate impacts to trail system.	Yes	Surveyors Ridge Trail Reroute Decision Memo.
B6-003,004,005: The development of new or expansion of existing recreation sites, facilities and trails may occur, but should avoid or protect sensitive watershed lands. These sites, facilities and trails shall not be permitted in The Dalles Watershed.	Pipeline will have an impact on trail system. Separate decision will mitigate impacts to trail system.	Yes	Surveyors Ridge Trail Reroute Decision Memo.
C1-001: Dispersed recreation opportunities shall be provided and encouraged. Hiking and trail use, driving for pleasure, hunting, wildlife viewing, berry picking, cross-country skiing, the use of off-road vehicles, and cultural resource	Installation of a modern pipeline and modern right-of-way in the same location as the	Yes	Surveyors Ridge Trail Reroute Decision Memo.

Standards & Guidelines	Relevant Element of Proposed Action	Does the Proposed Action Meet Standard as currently designed?	Data Used for Analysis
interpretation are examples of possible activities.	Surveyors Ridge trail.		

3.9.4 Summary of Effects

Recreation Opportunity Spectrum (ROS)

There would be no direct effects to the two ROS settings identified within the planning area under the No Action alternative or the Proposed Action alternative. Regardless of the course of action, the ROS settings would remain the same, and recreational opportunities within the settings would remain the same.

Dispersed Recreation

There would be no direct or indirect effects to dispersed recreation under the No Action alternative. Under the Proposed Action alternative there may be some impacts to dispersed recreation during project implementation if visitors are unable to access areas they would like to visit. Construction sights and sounds could also have a negative impact on someone's experience in the vicinity of the project if they are seeking solitude and quiet, however, this would be temporary. The new modern right-of-way could be perceived either positively or negatively by visitors depending on visitor perspective.

Trails

The Proposed Action alternative would impact the trail system in the vicinity of the project. Surveyors Ridge trail would be the most directly impacted as a 2.7 mile section of the trail overlaps with the right-of-way. This segment of trail would be permanently modified by the project. A reroute of the trail will mitigate concerns related to the change in the condition of the trail itself by continuing to provide a semiprimitive trail experience and continuing to connect Surveyors Ridge trail to the other trails along the Forest Road 44 corridor.

A segment of trail bypassing the construction will be constructed prior to implementation of the pipeline replacement, which would provide continuity for the majority of the trail system. The full reroute would not be completed until the entire pipeline replacement was completed, so there would be an impact in the short term. In the long term, the system would remain intact.

Additional information regarding this resource can be found in the full specialist report which is incorporated by reference and available in the project record.

3.10 Visual Qualities

3.10.1 Existing Condition

Scenic Context for Planning Area

The terrain along the existing pipeline corridor is mostly forested with gently rolling hills. Three miles of the pipeline falls along the Surveyors Ridge Trail #688. This portion of the pipeline corridor as well as the vast majority of the remainder of the existing pipeline corridor is bordered by mature trees. Where the

trail and the pipeline overlap, the trail tread averages about 24" wide. Most human activity along the corridor occurs where it overlaps with Surveyors Ridge Trail. The remainder of the corridor likely receives the highest amount of human use for pipeline maintenance. The overstory along the pipeline corridor is comprised of mixed conifer forest (Douglas-fir, grand fir, and ponderosa pine. There is little understory throughout the project area due to the density of the existing stand along the pipeline.

Human effects are noticeable throughout the project area as a result of the establishment and maintenance of the pipeline. Fire suppression over the past 100 years has led to lower species diversity and fewer openings in the stands adjacent to the pipeline, making visibility outside of the corridor difficult.

Visual Management Areas and Scenic Viewshed (B2)

Table 15. Visual Quality Objectives (VQOs 1) by Management Area

Management Areas	Distance Zone from Viewer Position			
	Approximate Percentage of Project Area	Foreground	Middleground	Background
Scenic Viewshed (B2)	48%	Management Area Standards and Guidelines specific to Dufur Mill Road Scenic Viewshed	Management Area Standards and Guidelines specific to Dufur Mill Road Scenic Viewshed	Management Area Standards and Guidelines specific to Dufur Mill Road Scenic Viewshed
Wood Product Emphasis (C1)	38%	Modification	Modification	Modification
Special Emphasis Watershed (B6)	14%	Modification	Modification	Modification

Dufur Mill Road Scenic Viewshed (Forest Road 4400)

The Dog River Pipeline crosses Dufur Mill Road approximately 1200 feet south of the road's intersection with Forest Road 1700. The pipeline crosses the road here and possibly runs parallel to the western edge of the road for less than 500 feet. The pipeline corridor itself is not easily visible from the road although it is approximately 90 feet west of the edge of the roadway, as it is screened by dense conifers and is at least 10 feet below the road grade of Dufur Mill Road.

The viewshed from the portion of the Dufur Mill Road which falls within the project area is heavily vegetated. Views beyond the shoulders of the road are blocked by this vegetation. The topography of this portion of the roadway also prohibits extended views. West of the road, the surrounding area is below road grade, while east of the road is steeper and above grade.

Overall, the views from this designated viewshed are of scenically attractive landscape dominated by natural line, colors, textures and forms. It is a thickly forested landscape with some signs of human activity stemming from trail intersections and signs of old timber sales further east, and outside of the project area. Some short portions of the road where previous harvest occurred, and trail intersections, meet a partial retention Visual Quality Objective (VQO) and not the prescribed retention VQO. However the majority of the road meets the prescribed retention VQO for the foreground (within ½ mile of the roadway), partial retention VQO for the mid-ground (1/2 mile – 5 miles from the roadway), and partial retention for the background (more than 5 miles from the roadway).

Project Area Trails

Surveyors Ridge Trail #688 intersects with the planning area. Visual sensitivity levels of the trail are classified by the Mt. Hood National Forest Plan. Within these sensitivity levels visual quality objectives are prescribed for foreground, far foreground, and middleground.

Designated Trails within the Planning Area

As a sensitivity level II trail intersecting the project area, Surveyors Ridge Trail currently has well established trail tread with few visible impacts along the trail. It is meeting the prescribed partial retention VQO for the visible foreground (660 feet from each side of the trail unless screened by topography.) The modification VQO is prescribed for both the far foreground (660 beyond the first 660 feet) and middleground (anything visible beyond 1,320 feet from each side of the trail.)

Approximately 2.7 miles of Surveyors Ridge Trail is located on top of the Dog River Pipeline. Surveyors Ridge Trail is 12.7 miles in its entirety. The portion of the trail collocated with the pipeline is also an access road for pipeline maintenance. Small portions appear to be a dirt road, but the majority of the trail collocated with the pipeline has grown in quite a bit. There is a lot of vegetative screening and trees have encroached along the edges of the roadway creating screening and shade.

A short portion of the trail follows somewhat parallel to Forest Road 44. The trail is not visible from Forest Road 44 due to the screening of trees and vegetation that have grown along the edge of the trail.

Wood Product Emphasis and Special Emphasis Watershed (C1 & B6)

While managed for different purposes, lands under these two management areas share a modification VQO for all distance zones. There has been a significant amount of past timber harvest activity within these management areas, and the effects of harvest activity are often visually evident. This harvest activity has created opportunities for viewing distant peaks in some places, which is noted as a desired condition in the Forest Plan. These harvested stands are generally not visible from the Scenic Viewshed (B2) within the project area due to vegetative screening.

Other human modifications to the landscape include a network of non-motorized trails. There are also unofficial dispersed campsites within these management areas. While human modifications are present within these management areas they remain visually subordinate to the natural landscape, and these areas currently meet the prescribed modification VQO.

3.10.2 Effects Analysis

No Action Alternative

There would be no direct effects as a result of implementing the No Action alternative. An indirect effect from implementing the No Action alternative would be the deterioration of the pipeline to the point that major excavation would need to be done along the pipeline corridor. Heaviest visual impacts of this work would occur along Surveyor's Ridge Trail or Dufur Mill Road Scenic Viewshed. If major repairs were needed under these circumstances, it could be difficult to maintain desired VQOs.

Proposed Action Alternative

Pipeline Installation

Impacts would occur along the existing pipeline. Along the majority of the pipeline corridor, many mature trees and dead wood line the 25 foot right-of-way, which has grown in significantly over the

years. The removal of this material would significantly alter the right-of-way. This change would not lead to a deviation from prescribed VQOs in most locations, as the desired VQO is modification. However, where the pipeline overlaps the trail, the prescribed VQO is partial retention. As a mitigation to the Proposed Action, Surveyors Ridge Trail has been rerouted so that the trail no longer overlaps the pipeline right-of-way for 2.7 miles. There is now one location where the trail intersects with the pipeline. This mitigation would reduce the magnitude of these effects and ensure that the Proposed Action remain consistent with prescribed VQOs.

The prescribed VQO of retention would be impacted where the pipeline crosses Dufur Mill Road. Currently, dense vegetation screens the view of the pipeline. Implementation of the project and maintenance of a 25 foot corridor resulting in the removal of a 25 foot band of vegetation perpendicular to the viewshed would have a negative impact on the desired VQO of retention. Visual impacts to the east of the road would be minimized due to topography. West of the road, the landscape is below the road grade, which would make the view of the pipeline corridor more noticeable. According to the Forest Plan, structures and improvements may be provided within scenic viewsheds in order to protect resource values, for administrative purposes, and to accommodate recreational use. The Dog River Pipeline is needed for administrative purposes for the City of The Dalles.

The Proposed Action would affect the scenic integrity of the landscape surrounding the pipeline. There would be a noticeable change in the width of the right-of-way, which would not only occur during implementation, but also be maintained for the lifetime of the pipeline. Throughout the majority of the project area this impact would not lead to a deviation from the prescribed VQO which is modification. For the portion of the project area that intersects with Dufur Mill Road, there would be a deviation from the retention VQO. According to the Forest Plan, structures and improvements may be provided within scenic viewsheds in order to protect resource values, for administrative purposes, and to accommodate recreational use.

Staging Areas

There are five possible staging areas that could be used for staging pipe, sand/gravel, and materials under the Proposed Action. Visual impact from the southern-most staging area along the 4400-11, would not be visible from the Dufur Mill Road due to vegetative and topographic screening. The other two proposed staging areas are located within land use allocations with prescribed VQO of modification, allowing for activities to visually dominate the characteristic landscape. The staging areas would be utilized during implementation and then returned to their previous condition, ensuring that impacts would be short-term.

Cumulative Effects

The items documented in Table 1 were considered when analyzing cumulative effects for visual quality. These items were analyzed as a result of their proximity to the planning area and their potential to have an effect on visual quality. The spatial context of the cumulative effects analysis lies within one mile of any portion of the proposed pipeline replacement.

Under the Proposed Action, these items could have an impact on the planning area. Combined with the Proposed Action, these actions would not deviate from Forest Plan standards.

3.10.3 Consistency Determination

All of the proposed alternatives described in this report would be in compliance with Mt. Hood Forest Plan and the Forest Service Manual.

Table 16. Consistency with Forest Plan Standards and Guidelines

Standards & Guidelines	Relevant Elements of Proposed Action	Consistency of the Proposed Action with the Forest Plan
FW-586: Sensitivity Level II trails shall have prescribed VQOs of Partial Retention, Modification, and Modification in near foreground, far foreground and middleground distance zones, respectively.	The degree to which the Proposed Action maintains prescribed VQOs.	The Proposed Action would be consistent with the Forest Plan provided mitigations were implemented. Specifically: The Surveyors Ridge Reroute Decision memo reroute which addresses impacts to VQOs.
FW-584 Trail VQOs shall be prescribed for near foreground, far foreground and middleground based on trail sensitivity level. Prescribed trail VQOs apply to both existing trails and planned trails.	The degree to which the Proposed Action maintains prescribed VQOs.	The Proposed Action would be consistent with the Forest Plan provided mitigations were implemented. Specifically: The Surveyors Ridge Reroute Decision memo reroute which addresses impacts to VQOs.
FW-556 The prescribed VQO should be achieved within one year after completion of any project activities.	Activity debris, staging areas, piling, and tree marking.	The Proposed Action would be consistent with the Forest Plan provided mitigations which address project impacts (i.e. equipment disturbance, tree marking, etc.) rehabilitation were implemented.
FW-552 The VQOs prescribed in management direction represent the minimum level that shall be achieved in long term visual resource management	The degree to which the Proposed Action maintains prescribed VQOs.	This effects analysis addresses this Standard and Guideline.
C1-007 Management activities shall achieve a VQO of Modification as viewed from open roads; local roads and temporary roads are exceptions	The degree to which the Proposed Action maintains prescribed VQOs.	This effects analysis addresses this Standard and Guideline.
B6-011 VQOs accepting less visual quality disturbance shall be applied when B6 Management Areas are located within “designated viewsheds” (Dufur Mill Road) (R PR PR)	The degree to which the Proposed Action maintains prescribed VQOs within the Dufur Mill Road viewshed.	This effects analysis addresses this Standard and Guideline.

Standards & Guidelines	Relevant Elements of Proposed Action	Consistency of the Proposed Action with the Forest Plan
B6-010 Management activities shall achieve a VQO of modification from open roads	The degree to which the Proposed Action maintains prescribed VQOs.	This effects analysis addresses this Standard and Guideline.
B2-012 Management activities shall achieve prescribed VQOs from the identified viewer positions	Proposed activity within the Dufur Mill Road Scenic Viewshed.	<p>The Proposed Action would be consistent with the Forest Plan provided mitigations were implemented. Specifically:</p> <ul style="list-style-type: none"> • The pipeline corridor would be visually subordinate along Forest Road 44. As many trees as possible would be retained along the Forest Road 44 corridor to maintain a visual buffer between the road and the pipeline corridor. • Decks of trees would be visually subordinate along the pipeline corridor adjacent to Forest Road 44. • Piles would be visually subordinate along the pipeline corridor adjacent to Forest Road 44. They would be burned within 2 years of contract termination. • Tree stumps will be visually subordinate along the pipeline corridor adjacent to Forest Road 44. Stump heights will be maintained at heights of 6 inches or less within Foreground (up to ½ mile) and be angled away from the roadway. • Tree paint would not be visible from the roadway along Forest Road 44.

Standards & Guidelines	Relevant Elements of Proposed Action	Consistency of the Proposed Action with the Forest Plan
B2-001: Structures and improvements may be provided to protect resource values, for administrative purposes, and to accommodate recreational use	Installation of a modern pipeline with a 25 foot right-of-way.	The pipeline installation and maintenance of the modern right-of-way corridor would be consistent with the Forest Plan as the pipeline is needed for administrative purposes for The City Of The Dalles.

3.10.4 Summary of Effects by Alternative

There would be no direct effects to scenic resources under the No Action alternative. The Proposed Action alternative would reduce and even eliminate vegetative screening along a short section of Forest Road 44 where the pipeline crosses the road within the Dufur Mill Road Scenic Viewshed. This would have a negative effect on VQOs, however, it would not deviate from Forest Plan Standards as structures and improvements may be provided within scenic viewsheds for administrative purposes. The reroute of the Surveyors Ridge Trail 688 would maintain VQOs along the trail corridor. Direct visible human effects within the scenic viewshed would include: stumps, staging areas, slash piles and tree marking. The Proposed Action includes mitigations to address these visual effects of actions commensurate with the retention VQO.

The Proposed Action would improve the efficiency of the Dog River Pipeline and maintain a modern right-of-way along the pipeline corridor. The modern right-of-way could be unattractive to some visitors, but others may enjoy it for access for non-motorized recreation. The No Action alternative would not result in any changes to the viewshed or right-of-way corridor.

In the short-term the Proposed Action would have a negative effect on the retention VQO within the Scenic Viewshed (B2) management area. The Proposed Action would not affect VQOs within the Wood Product Emphasis (C1) or Special Emphasis Watershed (B6) management areas. In the long term (10+ years) the No Action alternative would not impact the VQOs for these three management areas. The Proposed Action alternative would maintain VQOs for the Wood Product Emphasis (C1) and Special Emphasis Watershed (B6) management areas, and decrease retention VQOs along the pipeline corridor within the Scenic Viewshed (B2) management area due to the administrative need of The City Of The Dalles. The area of impact to the retention VQO from Forest Road 44 would be minimal, although it's impact would last the duration of the maintenance of the pipeline corridor.

Additional information regarding this resource can be found in the full specialist report which is incorporated by reference and available in the project record.

3.11 Cultural Resources

3.11.1 Existing Condition

Very few archaeological surveys or excavations have been conducted in the area, and little is known about the prehistory of the area. Nearby peeled cedar trees suggest that huckleberries and other plant resources were probably gathered, along with hunting forays for deer, elk and other wildlife. Expansive vistas of Mt. Hood were probably enjoyed for recreational and spiritual pursuits; a few rock cairns and rock features have been located overlooking the East Fork Hood River and the mountain. Some of the

current hiking trails and roads likely follow earlier Indian trails, especially the 4410 and 4420 roads, and possibly the 1700 and 1720 roads.

Although there are no known Traditional Cultural Properties known to exist near the project area, stacked rock features and lithic scatters within a few hundred meters of the project location indicate a varied and intensive use of the area. A projectile point recovered from the 4420 site (661NA0184) appears similar to the Eastgate type and suggests that the area was utilized at least 2500 years ago (Perino 1985).

Dog River Aqueduct

The Dog River Aqueduct is considered individually eligible for inclusion on the National Register of Historic Places. The Dog River Aqueduct (661EA0031) is largely intact as it was constructed in 1913-1914, with the exception of at least two areas repaired with steel pipe or terra cotta pipe. The feature also exhibits a high degree of engineering skills, with all of the labor conducted using hand tools. Features associated with the aqueduct include a total of eight rock pressure valves, seven rock culverts, the log stringer bridge crossing over Meadow Creek, scattered clay tiles, gauging stations, and a concrete access box. A portion of the pipeline was replaced with steel pipe during a previous failure in 1944. Today, pipeline maintenance consists of driving wooden wedges beneath the steel bands to tighten the seams and replacing deteriorated segments.

Dog River Head Works Log Cabin

The Dog River Head Works Log Cabin (661EA0073) is considered eligible for inclusion on the National Register of Historic Places as contributing elements to the historic district. It was constructed in 1904, is believed to be the oldest structure at the head works. The cabin has played a key role in the development and installation of the aqueduct. The cabin has experienced some modifications, is leaning into a hillside, and is partially deteriorated, but is still largely intact.

Dog River Head Works Cabin and Wood Shed

The Head Works Cabin is considered eligible for inclusion on the National Register of Historic Places as contributing elements to the historic district. The cabin portion of the Dog River Head Works Cabin and Wood Shed (661EA0074) was constructed in 1922 in the Mill Creek area and later moved to the head works. The structure has always functioned as the headquarters for the head works, and appears to be unmodified. According to Keyser, the cabin was constructed in 1922 on City of The Dalles property on Lower Mill Creek, and later moved (no date) to its current location. The cabin has always served as patrol and maintenance headquarters for City Water Works staff.

The Wood Shed component of the Dog River Head Works Cabin and Wood Shed (661EA0074) was constructed in the 1940s by Tobe Payne, and moved to its current location in 1969 (Unpublished manuscript; William Keyser August 27, 1980). The Wood Shed lies outside of the Period of Significance for the Dog River Head Works.

Dog River Diversion Cabin

The Dog River Diversion Cabin (661EA0075) is considered individually eligible for inclusion on the National Register of Historic Places. It was constructed between 1910 and 1920 (exact date unknown) during the installation of the pipeline. The structure is unique because of the "US" stamping exhibited on the ends of each log; this stamping shows early cooperation between the city of The Dalles and the US Forest Service in the management of the watershed.

Brooks Meadow Pipeline

The site was initially documented in 1990 by Kirk Metzger as part of the Dog River Aqueduct, FS number 666EA0031. For the purpose of this analysis the Brooks Meadow Pipeline is documented as FS

number 666EA0298, separate from the Dog River Pipeline. The site consists of a water transmission pipeline.

The Dog River Telephone Line

The Dog River Telephone line (661EA0350) consists of 12 trees with the remains of a telephone line along both sides Forest Road 4400-011. The telephone line remains consist of brown and white split-tree ceramic insulators or wire mountings. The trees are immediately adjacent to the road. The insulators are mounted on the trees at various heights. A 1916 Oregon National Forest Map shows a telephone system running north from a guard station at Brooks Meadow, which may have connected to the Dog River Telephone Line. The telephone line was probably installed to monitor conditions at the head gate works for the Dog River Aqueduct (Pipeline) and was most likely installed when the Dog River Head Works Cabin (661EA0074) was placed at the head works in 1922.

The Dalles Water Supply Ditch

The water Supply Ditch (661EA0351) is considered individually eligible for inclusion on the National Register of Historic Places. The intact portions of the ditch are a good example of early efforts by local communities to begin to manipulate and manage resources on Federal lands determined to be vital for their survival. The site is a linear feature that extends north from the bank of Dog River for approximately 2.18 miles. The ditch measures up to 16 feet wide and up to 5 feet in depth. The ditch begins on the east bank of Dog River about 3,143 feet upstream from the dam and diversion at the current headworks for the Dog River Aqueduct. No diversion remains at the point where the ditch leaves Dog River.

The Dog River Diversion and Impoundments

The Dog River Diversion and Impoundments is considered eligible for inclusion on the National Register of Historic Places as contributing elements to the historic district. This site is comprised of two small dams on the Dog River; an upper dam and a lower dam. The upper dam consists of concrete and is located approximately 78 feet upstream from the lower dam. There are two modern gauging stations at the site. The lower dam is located at the Head Gate Cabin, and consists of a complex structure designed to impound and divert waters from Dog River into the Dog River Aqueduct. There is a spillway at the east end of the dam. The aqueduct intake is beneath the Dog River Diversion Cabin (661EA0075), and consists of a 'pond' partially enclosed by concrete walls. There is a covered grate in front of the intake. Modern metal steps and railings lead up the north face of the dam, where a walkway constructed of boards leads to a metal sluice gate.

The Dog River Diversion and Impoundments (661EA0364) has been significantly modified through the years. The modifications include the addition of concrete abutments, the addition of walkways, the modification of the intake, the addition of modern steps, the addition of a sluice gate, and the addition of modern hand rails. The appearance of the dam has changed dramatically from the same structure photographed in 1923. The feature does not retain suitable integrity to be considered individually eligible for inclusion in the National Register of Historic Places; however, the feature can be considered as a contributing element to the Dog River Head Works historic district.

3.11.2 Effects Analysis

No Action Alternative

By not replacing the pipeline, Heritage Resources would continue to persist in their existing condition. The resources would be affected by decay, natural forces, and continued maintenance to the pipeline and associated infrastructure.

Proposed Action Alternative

To determine the effects of the Proposed Action, it is necessary to assess the significance, or eligibility for inclusion in the National Register of Historic Places, for each of the historic properties potentially affected by the Proposed Action.

Dog River Aqueduct

It is expected that although the historic pipeline would be left intact, most if not all of the associated features would most likely be obliterated during the installation of the new pipeline. The setting of the pipeline would be affected by the removal of trees and equipment maneuvering. However, the effects on the setting would only be temporary as the exposed slopes would be stabilized and it is expected that conifer trees would quickly restock in a natural process. Although the proposal calls for leaving the historic pipeline intact and functioning through the replacement process, the old pipeline will no longer carry water once the new pipeline is operational. Without constant exposure to water, it is expected that the historic pipeline will rapidly deteriorate. The Dog River Aqueduct is a buried artifact; replacing the pipe would have no impact on the visual character or historic nature of the pipeline; however, the visual setting would be disrupted temporarily. Interpretive opportunities would not be affected by the replacement of the buried pipeline. The Dog River Aqueduct has been fully documented. An interpretive sign explaining the history of the aqueduct would be erected along the Surveyors Ridge Trail. The Proposed Action would have **no adverse effect** on the Dog River Aqueduct. The project will have **no adverse effect** on the Dog River Head Works historic district.

Dog River Head Works Log Cabin

The proposed replacement of the Dog River Aqueduct would occur about 30 feet to the west of and adjacent to the cabin. Equipment maneuvering would occur along Forest Service Road 4400-011 adjacent to the cabin. The cabin would not be directly affected by the proposed project. However, the setting of the cabin would be affected by the removal of some of the vegetation between the road and the pipeline. However, the effects on the setting would only be temporary as the exposed slopes would be stabilized and it is expected that conifer trees would quickly restock in a natural process. There would be no indirect effects to the cabin. The proposed project would have **no adverse effect** to the Dog River Head Works Log Cabin (661EA0073). The project will have **no adverse effect** on the Dog River Head Works historic district.

Dog River Head Works Cabin and Wood Shed

The proposed replacement of the Dog River Aqueduct would occur about 30 feet to the west of the cabin, where the pipeline is situated beneath Forest Service Road 4400-011. The setting includes a small graveled parking area to the south of the cabin. There would be no direct or indirect effects to the cabin or the wood shed. The proposed project would have **no effect** to the Dog River Head Works Cabin and Wood Shed (661EA0074). The project will have **no adverse effect** on the Dog River Head Works historic district.

Dog River Diversion Cabin

The replacement of the Dog River Aqueduct would involve modifications to the intake, situated beneath the cabin. The intake has been modified and no longer retains any historic character. The cabin would remain in its current location; there are no plans to modify, move, or change the cabin. There would be no direct or indirect effects to the cabin. The proposed project would have **no effect** to the Dog River Diversion Cabin (661EA0075). The project will have **no adverse effect** on the Dog River Head Works historic district.

Brooks Meadow Pipeline

The replacement of the Dog River Aqueduct would involve use of Forest Service Road 1700-014 adjacent to and above the southern portion of the Brooks Meadow Pipeline. The southern portion of the Brooks Meadow Pipeline lies near the 25-foot wide maintenance/access corridor required for the pipeline replacement and would likely be impacted by the project. The northern portion of the pipeline above the crossing of Forest Service Road 1700-014 over Meadow Creek would remain unaffected by the project. It has been determined that the pipeline does not contribute to the NRHP eligibility of the Dog River Head Works historic district, and is not individually eligible for inclusion on the NRHP. There would be no indirect effects to the pipeline. The Brooks Meadow Pipeline is considered to be ineligible for inclusion in the NRHP, both as an individual resource and as a contributing element to the Dog River Head Works historic district. The proposed project would have **no effect** to the Brooks Meadow Pipeline (661EA0293) or to the historic district.

Dog River Telephone Line

The Dog River Telephone Line lies adjacent to Forest Service Road 4400-011 and within the 25-foot wide corridor for equipment maneuvering. The telephone line would likely be impacted by the project; many of the trees containing insulators are dead or dying, and would be removed as hazard trees. Other trees containing insulators may be obstacles to equipment maneuvering and would be removed. There would be no indirect effects to the telephone line. The Dog River Telephone Line is considered to be ineligible for inclusion in the NRHP, both as an individual resource and as a contributing element to the Dog River Head Works historic district. The proposed project would have **no effect** to the Dog River Telephone Line (661EA0350) or to the historic district.

The Dalles Water Supply Ditch

The ditch lies outside of any of the proposed areas affected by the project. The Dalles Water Supply Ditch would not be directly or indirectly affected by the project. There would be **no effect** to the Dalles Water Supply Ditch (661EA0351).

Dog River Diversion and Impoundments

A fish screen is scheduled to be installed as part of the project. The structure would measure about 40 feet long and 20 feet wide. The structure would connect to the existing dam and extend upstream for 40 feet, and extend into the stream 20 feet from the diversion intake gate. The fish screen would be added to the main diversion as described above. The addition of the fish screen would be a permanent attachment and visual change to the impoundment. There would be no indirect effects to the Dog River Diversion and Impoundments (661EA0364). The proposed project would have **no adverse effect** to the Dog River Diversion and Impoundments (661EA0364). The project will have **no adverse effect** on the Dog River Head Works historic district.

Cumulative Effects

For heritage resources, any effects are limited to site specific locations. Any cumulative effects would also be limited to heritage resources situated within proposed areas of ground disturbance. It has been determined that the project as proposed would have no adverse effect on heritage resources. All projects shown in Table 1, were considered for cumulative effects; however, none of the proposed projects involve heritage resources situated within the proposed project areas. There are no known projects that would overlap with the current project area in the foreseeable future, therefore there would be no cumulative effects for heritage resources as a result of implementing any of the action alternatives. The consultation for the Heritage Resource Survey results and recommendations for the project have been completed in accordance with the 2004 PA and submitted to the Oregon SHPO for review; the results of the SHPO review are pending.

3.11.3 Consistency Determination

The project would not adversely impact any significant heritage resources. Based on the proposed protective measures, the project meets the criteria in the Programmatic Agreement for “No Historic Properties Adversely Affected” determination.

This action is consistent with Forest Plan goals to protect important heritage resources. Heritage resource inventories were conducted in compliance with the 2004 PA during the project planning stage (FW-598, FW-600, FW-610, FW-602 and FW-606), the field survey results were fully documented (FS-608). Heritage resources potentially affected by the project activities have been evaluated for inclusion on the NRHP (FW-612), and the potential effects to heritage resources from the proposed projects have been assessed (FW-609, FW-610). All records and documents concerning heritage resources for the project are kept on file at the Hood River Ranger District, Mt. Hood National Forest (FW-626).

3.11.4 Summary of Effects by Alternative

Under the Proposed Action, The City of The Dalles proposes to replace the entire length of the Dog River Aqueduct and add a fish screen to the lower impoundment at the intake. Pipe, gravel, and equipment would be staged at as many as three storage areas. A complete (100%) survey of the entire project area revealed a collection of features and structures comprise the Dog River Head Works historic district, shown in Table 18.

Table 17. Dog River Head Works Historic District

Forest Service Temporary Number	Name	Description
661EA0031	Dog River Aqueduct	Historic wood pipeline
661EA0073	Dog River Head Works Log Cabin	Historic cabin
661EA0074	Dog River Head Works Cabin and Woodshed	Historic structures
661EA0075	Dog River Diversion Cabin	Historic Cabin
661EA0293	Brooks Meadow Pipeline	Historic wood/steel pipeline
661EA0350	Dog River Telephone Line	Historic telephone line
661EA0351	The Dalles Water Supply Ditch	Historic Ditch
661EA0364	Dog River Diversion and Impoundments	Historic dams, intake

The historic district was determined to be eligible for inclusion on the National Register of Historic Places (NRHP) based on NRHP Criterion A with a Period of Significance of 1887 to 1922. Properties determined to be individually significant and eligible for inclusion on the NRHP include the Dog River Aqueduct (661EA0031), the Dog River Diversion Cabin (661EA0075), and The Dalles Water Supply Ditch (661EA0351). Properties determined to be eligible for inclusion in the NRHP as contributing elements to the historic district include the Dog River Head Works Log Cabin (661EA0073), the cabin portion of the Dog River Head Works Cabin and Wood Shed (661EA0074), and the Dog River Diversion and Impoundments (661EA0364). Properties determined to be ineligible for inclusion on the NRHP and also non-contributing elements of the historic district include the Brooks Meadow Pipeline (661EA0293) and the Dog River Telephone Line (661EA0350). No protective measures are required or recommended for ineligible properties.

For each of the properties documented during the survey, it was determined that the project would have the effects listed in Table 18.

Table 18. Summary of Effects, Dog River Head Works

Temporary Number	Site Name	Eligibility	Determination of Effect	Description of Effects
661EA0031	Dog River Aqueduct	Individually Significant	No Adverse Effect	Property is below ground, no visual effects to historic character. Property has been fully documented. An interpretive sign will be installed. Most of associated features expected to be obliterated. Property is part of municipal water source with upgrades, maintenance expected. Upgrade required to avoid detrimental potential effects of failure. An interpretive sign explaining the aqueduct history would be installed. Setting affected by 25-foot wide installation corridor would be temporary; vegetation expected to restock naturally.
661EA0073	Dog River Head Works Log Cabin	Contributing element - moved from original location	No Adverse Effect	Setting of cabin affected by 25-foot wide installation corridor would be temporary; vegetation expected to restock naturally.
661EA0074	Dog River Head Works Cabin and Wood Shed	Cabin is contributing element-moved from original location. Wood Shed is outside of Period of Significance	No Effect	Setting is already open and would remain unchanged. Cabin would not be impacted by pipeline replacement
661EA0075	Dog River Diversion Cabin	Individually Significant	No Effect	Intake would be modified, but cabin would be left unmodified and intact.
661EA0293	Brooks Meadow Pipeline	Non-eligible	No Effect	Property determined to be ineligible
661EA0350	Dog River Telephone Line	Non-eligible	No Effect	Property determined to be ineligible
661EA0351	The Dalles Water Supply Ditch	Individually Significant	No Effect	The property lies outside of any activity areas associated with this project.
661EA0364	Dog River Diversion and Impoundments	Contributing element-has been	No Adverse Effect	The lower dam has already been significantly modified. The addition of a fish screen would be consistent

Temporary Number	Site Name	Eligibility	Determination of Effect	Description of Effects
		significantly modified		in scope and scale with previous modifications. No historic materials would be removed.

Additional information regarding this resource can be found in the full specialist report which is incorporated by reference and available in the project record.

3.12 Congressionally Designated Areas

3.12.1 Existing Condition

Wild and Scenic Rivers

Wilderness

There are seven wilderness areas that are entirely within the Forest (Badger Creek, Bull of the Woods, Clackamas, Mark O. Hatfield, Mt. Hood, Roaring River, and Salmon-Huckleberry) and portions of two other wilderness areas within the administrative boundary of the Forest (Lower White River and Mt. Jefferson).

The 1964 Wilderness Act established the National Wilderness Preservation System to ensure that parts of the United States would be preserved and protected in their natural condition. A wilderness area is defined, in part, as an area that generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable. The Wilderness Act places responsibility upon the administering agency for preserving the wilderness character of the area. The Act specifically prohibits motor vehicles, motorized equipment and mechanical transport in all wilderness areas (Public Law 88-577, Sec. 4 (c) Prohibitions of Certain Uses).

The Omnibus Public Land Management Act of 2009 (Public Law 111-11) created additional wilderness areas and enlarged some existing wilderness areas including the Mt. Hood Wilderness.

“Congress does not intend that designation of wilderness areas in the State of Oregon lead to the creation of protective perimeters or buffer zones around each wilderness area. The fact that non-wilderness activities or uses can be seen or heard from the areas within the wilderness shall not, of itself, preclude such activities or uses up to the boundary of the wilderness area.”

Inventoried Roadless Areas (IRAs)

Inventoried Roadless Areas (IRAs) possess social and ecological values and characteristics that are becoming scarce in our nation's increasingly developed landscape. Protecting air and water quality, biodiversity and opportunities for personal renewal are highly valued qualities of roadless areas. Conserving IRAs leaves a legacy of natural areas for future generations.

The Forest Plan directs the Forest to maintain the roadless character of the Bull of the Woods Lake, Mt. Hood Additions, Olallie, Roaring River, Salmon-Huckleberry, Twin Lakes, and Wind Creek IRA's. Of these areas, none are within or adjacent to the Dog River Pipeline Replacement planning area. The Omnibus Public Land Management Act of 2009 (Public Law 111-11) designated some IRA as part of the National Wilderness Preservation System, and identified additional areas with IRAs as potential wilderness with a process to become part of the wilderness system.

3.12.2 Effects Analysis

Wild and Scenic Rivers

A full analysis of the effects to the Wild and Scenic Rivers is included in Section 3.12.3, Effects Analysis from the Proposed Action alternative on Wild and Scenic Rivers.

As the Outstandingly Remarkable Values (ORVs) for the East Fork Hood River Wild and Scenic River segment are associated with geologic landforms (lava flow and debris flows) that exist outside any

proposed treatment areas there would be no adverse effect to the ORVs for which the river segment was added to the National Wild and Scenic River System.

Wilderness

No activities of any kind are proposed within the wilderness itself. Additionally, none of the proposed treatment areas are adjacent or border any existing or proposed wilderness areas. However, activities up to the wilderness boundary are permissible under the Oregon Wilderness Act of 1984 and the Omnibus Public Land Management Act of 2009. Section 6 of the 1984 Act states:

“Congress does not intend that designation of wilderness areas in the State of Oregon lead to the creation of protective perimeters or buffer zones around each wilderness area. The fact that non-wilderness activities or uses can be seen or heard from the areas within the wilderness shall not, of itself, preclude such activities or uses up to the boundary of the wilderness area.”

Inventoried Roadless Areas

No activities are proposed with the any IRA. As such it is not expected that there would be any impact to the IRAs through implementation of the Proposed Action.

3.13 Climate Change

3.13.1 Existing Condition

The Council on Environmental Quality has identified that climate change is a particularly complex challenge given its global nature and the inherent interrelationships among its sources, causation, mechanisms of action, and impacts. Projects and programs with a Federal nexus requiring the disclosure of environmental impacts under NEPA have the potential to either affect the amount of greenhouse gases (GHGs) in the atmosphere or to be affected by climate change.

This project was not specifically designed to mitigate or respond to potential climate change. This section addresses aspects of the project that may affect carbon emission or sequestration and how the project may impact the forest's ability to deal with climate change. This analysis will not attempt to quantify carbon emission or sequestration.

This project involves the thinning of trees in plantations, recently unmanaged stands, and sapling thinning. The Dog River Pipeline Replacement does not fall within any of these main contributors of greenhouse gas emissions. Forested land will not be converted into a developed or agricultural condition. In fact, forest stands are being retained and thinned to maintain a vigorous condition that supports trees, and sequesters carbon long-term. US forests sequestered 757.1 megatonnes¹ of carbon dioxide after accounting for emissions from fires and soils in 2010 (US EPA, 2015). However there is growing concern over the impacts of climate change on US forests and their current status as a carbon sink. There is strong evidence of a relationship between increasing temperatures and large tree mortality events in forests of the western US. There is widespread recognition that climate change is increasing the size and frequency of droughts, fires, and insect/disease outbreaks, which will have major effect on these forests' role in the carbon cycle (Joyce et al. 2014). Forest health and growth issues are discussed in Section 3.1, Vegetation Resources.

3.13.2 Effects Analysis

¹ A megatonne is one million metric tons of CO₂; equal to about 2.2 billion pounds.

No Action Alternative

As no vegetative manipulation would occur and no fuel treatments would take place the current carbon sequestration rates would remain unchanged and no additional carbon would be released into the atmosphere. The No Action alternative would not result in carbon emissions from vehicles or burning and would result in the retention of relatively slow growing trees. The mortality that results would be retained on site (see Sections 3.1, Vegetation Resources and 3.6, Wildlife for more details).

Proposed Action Alternative

This project is not likely to have direct localized effects on climate. By its very nature, the discussion of a project's effect on climate change is indirect and cumulative because the effects occur at a different time and place, and because the scale of the discussion is global. Since it is not reasonable to measure a project's global impact, the discussion here focuses on key elements of forest management discussed in the scientific literature.

For this proposal, the following actions have the potential to affect carbon emissions or sequestration:

- Mechanical thinning can enhance the health of the area by making the residual trees more resistant to drought, fire, and disease (Millar 2007).
- Variable density thinning with skips and gaps and the retention of minor species would result in stands that are resilient and better able to respond to whatever changes come in the future (Millar 2007).
- Fossil fuel would be used by equipment such as saws, tractors, skyline yarders and log trucks. It would be possible for some of this equipment to use biofuels if available and priced competitively.
- Logging debris at landings would be burned on site or transferred to a bio-energy facility to use in generating power. Residual and/or natural fuel accumulations would be burned through pile burning. All of these activities would release carbon into the atmosphere.
- Utilizing trees to create wood products such as fiber and timber would sequester carbon, while meeting the needs of society. (Nabuurs 2007)

Cumulative Effects

The Proposed Action would result in some carbon emissions and some carbon sequestration. The benefits to forest health and resiliency with the Proposed Action would allow stands to better respond and adapt to the future climate variation or change. See Section 3.1, Vegetation Resources for a discussion of forest health and resiliency.

3.14 Environmental Justice and Civil Rights

On February 11, 1994, President Clinton issued the Executive Order on Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (Executive Order 12898). This order directs agencies to identify and address disproportionately high and adverse human health or environmental effects of projects on certain populations. In accordance with this order, the proposed activities have been reviewed to determine if they would result in disproportionately high and adverse human and environmental effects on minorities and low-income populations.

The communities of Mt. Hood/Parkdale, Odell and Hood River are less than 20 miles of the planning area. The communities of Dufur and The Dalles are less than 20 miles to the east / northeast of the planning area. Other communities that may have an interest in the proposal would include Sandy, Gresham and Portland to the West.

The Dog River Pipeline Replacement planning area is located on usual and accustomed land for the Confederated Tribes of Warm Springs (as is all of the Mt. Hood National Forest). The Treaty of 1855 granted the Confederated Tribes of the Warm Springs (CTWS) the right of “usual and accustomed” gathering of traditional native plants and “special interest” use. According to the Ethnographic Study of the Mt. Hood National Forest (French et al. 1995), no traditional use areas have been identified in this planning area. No activities are proposed that would preclude any granted rights. Therefore, the proposal to implement this project would not have any adverse effect on members of the CTWS.

Because this project does not propose to increase, or reduce the amount or type of activities that occur on the forest, the proposal to implement this project is not expected to have any negative effect on special forest product gatherers.

3.15.1 Conflicts with Plans, Policies or Other Jurisdictions

This project would not conflict with any plans or policies of other jurisdictions, including the Tribes’. This project would not conflict with any other policies, regulations, or laws, including the Clean Water Act (see Section 3.5), Endangered Species Act (see Section 3.6.1), National Historic Preservation Act (see Section 3.13) and Clean Air Act (see Section 3.15). Other potential conflicts with plans, policies, or other jurisdictions are discussed below.

3.15.2 Floodplains and Wetlands

There would be very limited impacts to floodplains or wetlands from this project. Due to the steepness of the topography, small stream size and confined nature of streams in this area, floodplain width is fairly limited. Information on wetlands and floodplains are discussed in Section 3.3 (Hydrology), and 3.4 (Fisheries). Due to the PDCs and BMPs which are aimed at minimizing the impacts to wetlands and floodplains, there would be minimal direct and indirect effects.

3.15.3 Air Quality

The proposed action associated with the Dog River Pipeline replacement has the potential to affect air quality: burning slash, exhaust generated by vehicles, equipment, chainsaws and helicopters and dust created by vehicles that drive on aggregate surface and native surface roads.

Summary - The following sections show that the proposed action complies with direction in the Forest Plan (as amended) and that activity fuels would be managed appropriately to minimize fire hazard while also minimizing effects to resources. The timing and quantity of smoke created by pile burning and broadcast burning would be managed to minimize air quality impacts.

3.15.3.1 Existing Conditions

Fine particulates less than PM_{2.5} (2.5 micrometers in diameter) cause reductions in visibility due to absorption and scattering of light by suspended particles. Almost all smoke particles from wildfire and prescribed fire, residential wood stoves and fireplaces, industrial boilers, field burning, diesel combustion, and other combustion processes can be characterized as fine particulates, primarily PM_{2.5} (ODEQ 2014). These small particulates can be inhaled and cause respiratory problems, especially in smoke sensitive portions of the population, such as the young, elderly, or those predisposed to respiratory ailments. Particles can accumulate in the respiratory system and aggravate health problem such as asthma.

Oregon Department of Environmental Quality classifies Class I Areas as “certain wilderness areas designated by Congress as federal Class I Areas that are subject to visibility protection under the Environmental Protection Agency’s Regional Haze Rule and the federal Clean Air Act”(ODEQ 2014).

The closest communities to the project area are the City of The Dalles, Parkdale, Odell, and the City of Dufur. Winds in this area can blow in different directions potentially affecting these communities.

3.15.3.2 Direct, Indirect and Cumulative Effects

The burning of slash piles would typically be implemented during fall when favorable smoke dispersal conditions are expected. Pile burning prescribed fires are primarily conducted when the ground is frozen or saturated, reducing the potential of smoldering and creeping into adjacent fuels. Prescribed burning would occur when the weather conditions would minimize visibility effects to Class I airsheds.

Cumulatively, this project uses similar techniques and timing as other projects in the Mt. hood National Forest. While it is not known what year treatments would occur in or when piles would be available for burning, prescribed burning of various projects would occur spread over several years and at appropriate times of the year which would result in less air quality impact compared to wild fire. Air quality throughout Oregon can be affected by wildfire. Projects that reduce the likely size or intensity of wildfire have the effect of reducing overall air quality impact.

Cumulative effects of the proposed action when added to other fuel reduction projects and the impacts of wildfire and of fire suppression tactics would not be substantial.

3.15.3.3 Forest Plan Standards and Guidelines

The project is consistent with FW-039 to 053 because smoke would be minimized.

The Oregon Smoke Management Plan, which is administered by the Oregon State Forester, regulates the amount of forestry related burning that can be done at any one time. The amount of burning that can occur on any one day depends upon the specific type of burning, the tons of fuel loading to be ignited, and the atmospheric conditions available to promote particulate matter mixing and transportation of smoke away from sensitive areas. Through compliance and cooperation in the implementation of the Oregon Smoke Management Plan, the Proposed Action would comply with the following laws and regulations.

- The Federal Clean Air Act (CAA) is the primary legal basis for air quality regulations across the country.
- Oregon Smoke Management Plan, OS477.013, as administered by Oregon Department of Forestry
- Oregon State Implementation Plan (The Federal Clean Air Act Implementation Plan)
- Oregon Administrative Rules OAR 629-0048-0001: Smoke Management Rules
- Oregon Visibility Protection Plan for Class I Areas, OAR 340-200-0040, section 5.2
- Forest Service Best Smoke Management Practices 2012
- Forest Service Manual 2500-Watershed and Air Management, Chapter 2580-Air Resource Management - The project would minimize the impacts on air quality through compliance and cooperation with Federal, state and local air regulations to prevent significant adverse effects of air pollutants, mitigation of adverse impacts from prescribed fire on air resources through the application of Best Smoke Management Practices, and protection of air quality related values within Class I areas.

3.15.4 Consumers, Civil Rights, Minority Groups, Women, and Environmental Justice

Executive Order No. 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations, directs Federal agencies to address effects accruing in a disproportionate way to minority and low income populations. No disproportionate impacts to consumers, civil rights,

minority groups, and women are expected from this project. Commercial thinning work would be implemented by contracts with private businesses. Project contracting for the project's activities would use approved management direction to protect the rights of these private companies. Section 3.14 contains more information on Environmental Justice.

3.15.5 Treaty Resources and Reserved Indian Rights

No impacts on American Indian social, economic, or subsistence rights are anticipated. No impacts are anticipated related to the American Indian Religious Freedom Act. The Confederated Tribe of Warm Springs was contacted in reference to this Proposed Action. More information on consultation with the tribes is available in Chapter 1 section 1.6.

3.15.6 Inventoried Roadless Areas and Potential Wilderness Areas

There would be no impacts to Inventoried Roadless Areas (IRA) as none exist within the planning area. The planning area contains no potential wilderness areas within the bounds of the planning area. Any inventory of these lands is a Forest Planning requirement, not a project planning requirement. See section 3.12, Congressionally Designated Areas for more information about other congressionally designated areas.

3.15.7 Prime Farmlands, Rangelands, and Forestlands

None of the alternatives would have an adverse impact to the productivity of farmland, rangeland, or forestland because none were identified in the project area.

3.15.8 Potential or Unusual Expenditures of Energy

The No Action alternative would not require any expenditure of fuel or energy. The Proposed Action would require expenditures of fuel for workers to access the planning area, use power equipment, and to utilize the logging systems, and installation of the pipeline. Overall, the Proposed Action would not result in any unusual expenditure of fuel.

3.15.9 Irreversible and Irretrievable Commitments of Resources

Irreversible commitments of resources are those that are forever lost and cannot be reversed. Irretrievable commitments of resources are considered to be those that are lost for a period of time and, in time, can be replaced. The use of rock for road surfacing and pipeline placement is an irreversible resource commitment.

3.15.10 Conflicts with Plans, Policies, or Other Jurisdictions

NEPA at 40 CRF 1502.25(a) directs "to the fullest extent possible, agencies shall prepare draft environmental impact statements concurrently with and integrated with . . . other environmental review lands and executive orders."

Based on information received during scoping, informal consultation meetings, and analysis in the EA, none of the alternative under consideration would conflict with the plans or policies of other jurisdictions, including the Confederated Tribes of Warm Springs. This project would not conflict with any other policies and regulations or laws, including the Clean Water Act, Endangered Species Act, Magnuson-Stevens Fishery Conservation and Management Act, National Historic Preservation Act, and Clean Air Act. Refer to the following sections for discussions regarding these laws:

Section 3.5 Water Quality – Clean Water Act;

Section 3.4 Fisheries and Aquatic Fauna, 3.6 Wildlife and 3.7 Botany – Endangered Species Act;

Section 3.4 Fisheries and Aquatic Fauna – Magnuson-Stevens Fishery Conservation and Management Act;

Section 3.11 Cultural Resources– National Historic Preservation Act; and

Section 3.15.3 Fuels Management and Air Quality – Clean Air Act